THE ARCHITECTURAL FORUM

IN TWO PARTS

PART ONE
ARCHITECTURAL DESIGN

JANUARY
1928

All it needed was a fine floor

Effective use of Goodyear Rubber Tiling in basement of First Presbyterian Church at Buffalo, New York
Installed by Griffiths Floor Company, Buffalo

This basement space was changed into a cheery and attractive room by use of the modern floor material, Goodyear Rubber Tiling. It was chosen for quietness, long wear, simple beauty *and laboratory cleanliness.*

Because of these qualities, the material has made good with architects and builders everywhere. After first proving its fitness for business places, churches, hospitals, etc., Goodyear Rubber Tiling has won its place in the home. You'll find it suitable for *any room in the house.*

An infinite variety of patterns from which to choose, fourteen solid colors, marbleized effects, numerous two and three-color combinations. Quality considered, the cost is surprisingly low.

Complete architectural data gladly forwarded upon request. Just drop a post card to Goodyear, Akron, Ohio, or Los Angeles, California.

The Greatest Name in Rubber

GOODYEAR

RUBBER TILING

Architecture
Wahr

THE ARCHITECTURAL FORUM

INDEX TO VOLUME XLVIII — JANUARY TO JUNE INCLUSIVE, 1928

Index to Illustrations According to Subject

BUILDINGS (Complete)

KEY TO PAGES AND PLATES

		Pages	Plates
January	Part I	1- 96	**1- 24**
	Part II	97-152	
February	Part I	153-248	**25- 48**
	Part II	249-304	
March	Part I	305-416	**49- 80**
	Part II	417-480	
April	Part I	481-576	**81-104**
	Part II	577-632	
May	Part I	633-728	**105-128**
	Part II	729-784	
June	Part I	785-896	**129-160**
	Part II	897-952	

*** Illustrated; ex., exterior; in., interior; pl., plan.**

BRIDGES

SKETCHES

INTERIORS

ARCHITECTURAL DETAILS

Index to Articles According to Subject

Index to Articles According to Subject—*Continued*

Index to Illustrations According to Architect

CONTENTS *for* JANUARY 1928

Part One

Architectural Design

Part Two

Engineering and Business

Published Monthly by
ROGERS & MANSON COMPANY
383 Madison Avenue, New York

Howard Myers, Pres.; James A. Rice, Vice-Pres.; Robert Sweet, Sec. and Treas.; Paul W. Hayes, Asst. Treas.
Yearly Subscription, Payable in Advance, U.S.A., Insular Possessions and Cuba, $7.00. Canada, $8.00. Foreign Countries in the Postal Union, $9.00

Single Copies: Quarterly Reference Numbers, $3.00; Regular Issues, $1.00. All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter at the Post Office at New York, N. Y.

The trade-mark **BAKELITE** on the back *of* each one identifies Bakelite Molded Switch Plates

TO prevent the substitution of Switch and Outlet Plates made of inferior materials, the wiring device manufacturers forming them of Bakelite Molded place the trade-mark **BAKELITE** on the back of each plate. By insisting upon plates bearing this mark you are making certain that the plates furnished will not lose their color or lustre under any climatic conditions.

Bakelite Molded Switch and Outlet Plates are regularly made in brown and black, but are also obtainable in a variety of pleasing colors. The leading wiring device manufacturers make them, and we would be glad to send you a list of their names and to see that samples are shown to you.

BAKELITE CORPORATION
247 Park Avenue, New York, N. Y. Chicago Office, 635 West 22nd Street
BAKELITE CORPORATION OF CANADA, LTD., 163 Dufferin Street, Toronto, Ont

BAKELITE

REGISTERED U. S. PAT. OFF.

THE MATERIAL OF ∞ A THOUSAND USES

"The registered Trade Mark and Symbol shown above may be used only on products made from materials manufactured by Bakelite Corporation. Under the capital "B" is the numerical sign for infinity, or unlimited quantity It symbolizes the infinite number of present and future uses of Bakelite Corporation's products."

THE EDITOR'S ANNOUNCEMENT

THE triangle is now more than ever the symbol of architecture, with Design as its base, joined on the one side by Engineering, and on the other by Business. The architect realizes that his progress depends on the strength and breadth of his knowledge and ability in each of these three major divisions of his profession. The basic forces which are giving their impress to every form of business and professional activity are similarly influencing architecture. In the case of the architect, economic pressure, new standards of living, progress in the science of building, new materials and equipment are among the things which have increased his responsibility and complicated his problems. To meet these changing conditions THE ARCHITECTURAL FORUM enlarges its editorial scope and adopts a new format to parallel the work and interests of the architect so as to render to him as complete a service as he must render to his client.

In order that the increased content of THE ARCHITECTURAL FORUM shall be most convenient for reading and reference, a natural physical division of the magazine has been made. One part is devoted to architectural design, its enlarged content selected for architects by architects for its practical and inspirational value. The other part of THE ARCHITECTURAL FORUM is devoted in its entirety to engineering and business subjects, authoritatively and adequately treated. As a further service the advertising has been carefully classified so that all products which are essentially of interest because of their design character are found in the Design Section, while those products which are primarily of an engineering or structural character are placed in the Engineering and Business Section thus facilitating the architect's use of this important feature of the magazine. As heretofore, THE ARCHITECTURAL FORUM will appear as a monthly.

It is hoped that the additions which have been made to THE FORUM as well as the changes in its physical character will increase the value of this journal to the profession. Whatever measure of recognition it has achieved in the past has reflected the generous and helpful interest of architects. By making available the work of their offices and by suggesting subject matter and improvements, they have lightened the burden of the editorial staff in its effort to produce an architectural magazine service which would completely satisfy the needs and aspirations of the profession. It is hoped that the new FORUM will prompt a continuation of this interest in ever-increasing measure.

Parker Morse Hooper

STUDY FOR A FRESCO DECORATION SYMBOLIZING
ELECTRICAL COMMUNICATION THROUGH WATER, EARTH AND AIR,
FOR THE TELEPHONE BUILDING, NEWARK

From a Water Color by J. Franklin Whitman, Jr.

Voorhees, Gmelin & Walker, Architects

The Architectural Forum

THE
ARCHITECTURAL
FORUM

VOLUME XLVIII NUMBER ONE

JANUARY 1928

A NEW ARCHITECTURE

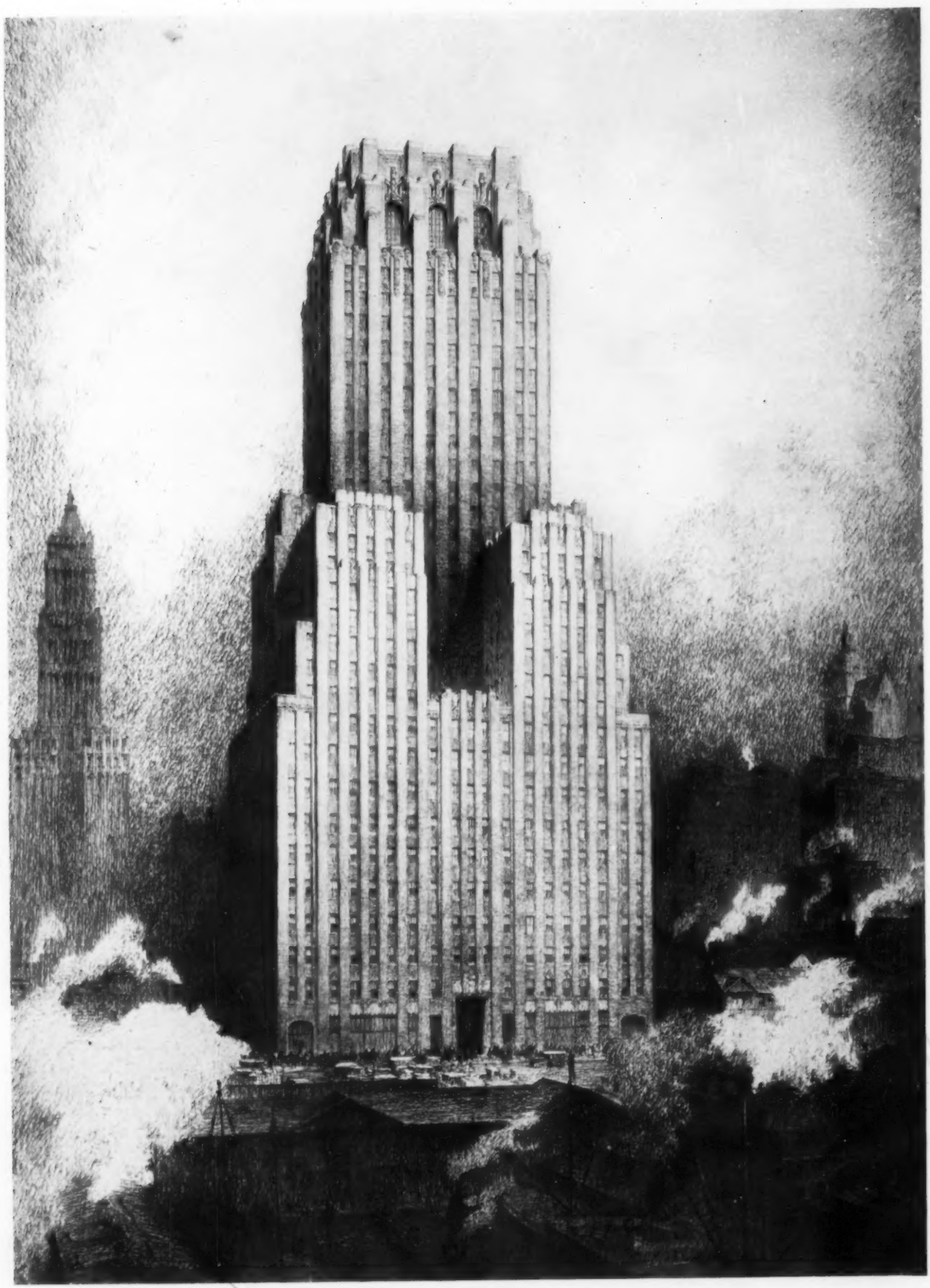
BY
RALPH T. WALKER
VOORHEES, GMELIN & WALKER, ARCHITECTS

IT seems to me that we have come to a bend in the road, a place in which to pause, where we can look backward over the past and see its contributions and at the same time look forward over the future and glimpse its possibilities. We realize that behind us are the known and the secure, and that before us are the unknown and adventure. To the rear is the broad road of imitation, which we have traveled; ahead is the narrow way of creation, which is yet to be explored. We shall take into the future, however, a part of the past and a part of the present, even though these parts be but remembrance; this is true of architecture which grows out of the physical and spiritual needs of humanity, and while these needs change, they never are completely overthrown but rather are the new needs woven into the woof of the older. This being so, it would seem that the architectural expression of these needs, while taking on new aspects, will continue to retain much of that which is of the past and of today. In fact, it is the tying in of one need-expression to another that makes for a universal quality without which no art lives; for without universal aspect, art is but a fad,—poster-like in conception, here today and gone tomorrow. Though art may change, it must be enduring.

Architecture is neither the structure nor the skin that forms the covering, but is a balance between them and the requirements of man. It should follow, then, that true architecture can never be entirely new but becomes, if creative, something akin to a series of fresh viewpoints through which the individuality of the designer and the times in which he lives are expressed. At the convention of the American Institute of Architects, last spring, a day was devoted to the discussion of collaboration. Among those who spoke, the craftsman was the only man who urged the necessity of leaving behind something of himself and of his time; something not imitative but creative. The change that is coming into our architecture is coming through that desire for creation, with a full realization of the changing needs of man, and not in a mere desire for bizarre change. Creation presupposes that there is a sufficient knowledge of the inherent nature of the architectural need,—the ways and means to create from within rather than from without, whereas imitation is wholly external in its quality. In the past architecture has been limited by a lack of scientific structural knowledge, and our entire sense of proportion has been built upon that lack. The possible span of the lintel and the arch has so formed our conceptions of what is pleasing to the eye that in the use of such materials as steel and concrete both the structure and the skin have been imitative of units that conform to traditional forms. And, strange as it may seem, it is almost as difficult to rid the engineer as it is the architect of these ideas. It is easy to think of structure in design as being of larger moment than it actually is, whereas it should be thought of as having but this one function,—to span the space desired and to span it economically, whether beautifully or not.

For the first time in the history of architecture we have at our disposal means and methods of building that are unlimited in their possibilities. Our ways of construction are the most flexible in the long struggle to span space, and new forms are coming into existence that are strange to our sense of fitness, although they gradually become part of it. It can be questioned, however, whether beauty is ever synonymous with economy of construction. Certainly most of the so-called modern European architecture, although extremely economical, is far from pleasing in appearance. It seems to me a fallacy that anything resolved into absolute efficiency must necessarily be in the same degree beautiful. Therefore, while the desire to be economical in structure is laudable, it is not by any means the end of the story that the French architects, such as Ferier and LeCorbusier, think it is.

The fundamental, spiritual and intellectual needs of man can never be satisfied with the thin, austere design of the engineer-architect, which, while perfectly honest, fails to take into consideration the thoughts or emotions of anyone other than a "Robot." We are beginning to understand scientifically that which was probably intuitive during the great periods of architecture,—that while it is necessary to securely enclose the body, every effort should be made to keep the mind and spirit unenclosed,—in other



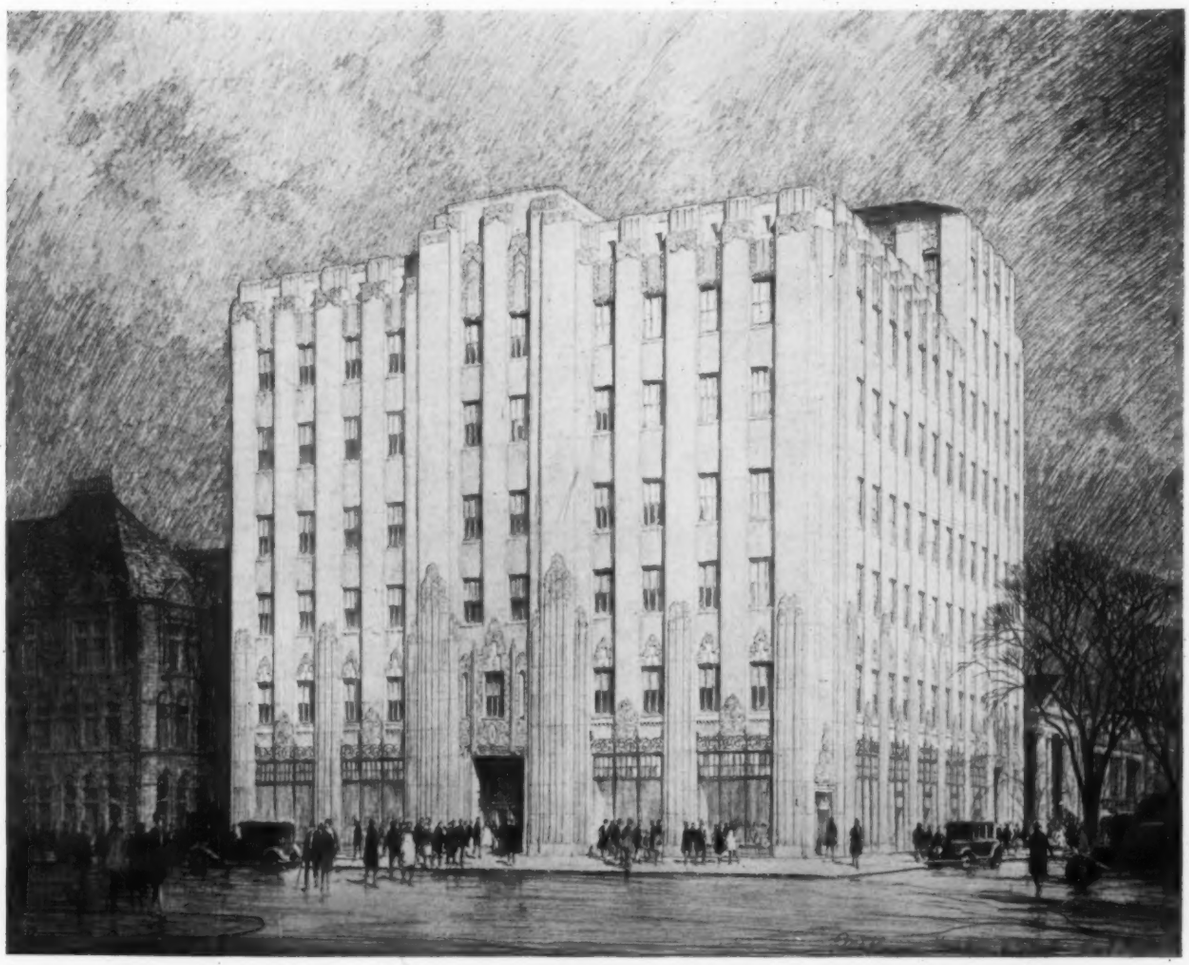
NEW YORK TELEPHONE BUILDING
VOORHEES, GMELIN & WALKER, ARCHITECTS

NEW JERSEY BELL TELEPHONE BUILDING, NEWARK
VOORHEES, GMELIN & WALKER, ARCHITECTS

words, to create horizons beyond the immediate walls. In looking forward to a new architecture, the ideas of the use of materials that have held in the past will be slowly discarded, and new materials or uses will come into effect. Concrete, which at present is actually a dull mass of mud, will have, with a more intelligent use of forms and of the material itself, an unusual amount of pattern and variety of color besides its economy to recommend it. Cast stone, which at present is imitative of natural stone, will have character and beauty that are by nature parts of itself. Synthetic materials, because of ease in manufacture, will take a much larger part in our design, but they will be developed and used for their inherent qualities, which will grow in importance.

It seems to me that another fallacy which holds of this day is that the use of the machine tool means standardization and utter, stark simplicity, whereas the reverse is actually true; the machine means diversity, and complexity, which is, after all, the spirit of our times. The standardized mass production of today will not be of necessity the standard of tomorrow. In fact, our talk of standards is brought about because of the difficulty that comes in maintaining them. Americans are spoken of as the most mechanical group of people in the world, yet nowhere is individuality in architecture, or lack of what is known as a "school," more in evidence than in this country. Our cities and home developments are chaotic at present because of their great diversity,—in other words, the regularity we know as mechanistic is of the tool only and not really of its product.

The new architecture will not be a thing of slab-sided cubes or spheres, built up of plane and solid geometry in which there is no element of time (something absolutely lacking in either primary forms or colors), but will have an infinite variety of complex form and an intricate meaning that will be comprehensible to minds that are able to project thought beyond infinity. Otherwise we might well be in a position similar to that of the pessimistic Basque who had inscribed over his door these words: "The past has deceived me; the present harasses me; the future horrifies me." The present is a time of change in every sphere of life, and architecture as a living art must change with the times. But the changes will be worked out in accord with rules governing all arts.



Syracuse Telephone Building
Voorhees, Gmelin & Walker, Architects

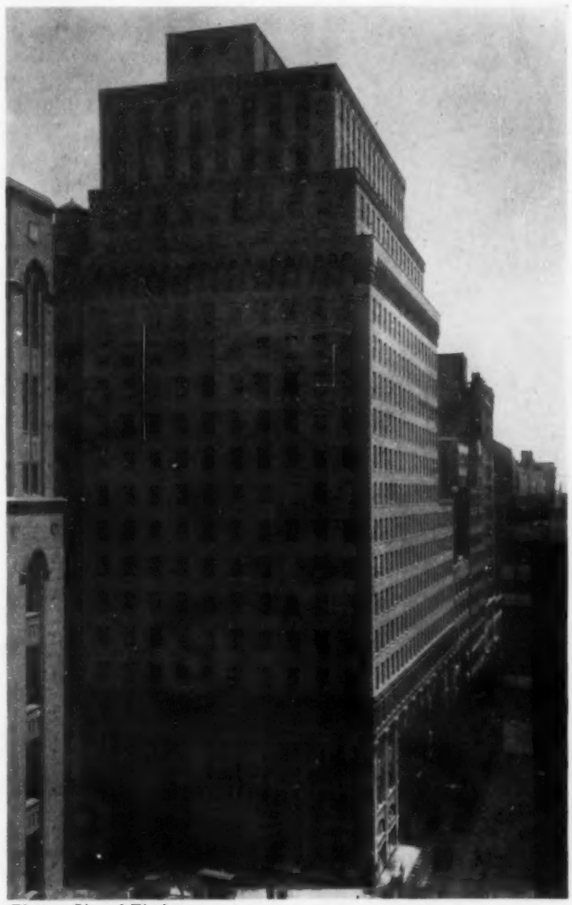
OFFICE BUILDINGS OF TODAY AND TOMORROW

EDITOR'S NOTE. This article is based on conversations with several leading architects who specialize in commercial architecture

THE point has been reached in the development of American architecture where many of our buildings are stark expressions of practical commercial requirements in terms of modern construction; piles of simple, rectangular forms like stacks of cardboard boxes of varying sizes; while our monumental buildings are architecturally admirable, elaborate and costly pieces of scenery, their classic orders and their Gothic arches are just so much false construction in stone, hung on steel framework. In the case of the former, buildings which must earn the maximum profit on the investments, the architect has been compelled to abandon all pretense; nothing is permitted to be spent upon the simulation of old masonry construction. The building is a shell, and a shell it must appear. So far, little has been done to give it beauty. If the architect is able to secure effective massing and good proportion in the necessary parts of the building, no one is likely to object, and the good appearance of the structure enhances its value. Here and there we see attempts to enrich a building of this kind in a consistent manner, and the result is usually the application of a "linoleum pattern" to the wall surfaces forming the spandrels between windows of the various stories.

Between these two classes of buildings, those in which utility and profit are the governing conditions on the one hand and such monumental structures as large public libraries and museums, churches and great railway terminals on the other hand, lies a third class of structures, including great office buildings, important hotels, etc. It is in the designing of buildings of this type that the greatest possibilities are open to the architect. He is neither hampered by being held to the most rigid economy nor obliged to mask modern construction with ancient forms. Usually these buildings are tall. They can be seen at great distances, often for miles, and the silhouette is consequently important. That this fact is recognized is shown by the more careful study architects have been giving lately to the silhouette. In addition to securing good composition in the handling of the stepped masses of these buildings, which have the setbacks required by the zoning laws, the architect is permitted usually to elaborate the highest portion. This he does, most often by giving it the form of a tower of characteristic shape which distinguishes the building as far as it can be seen. So right here we have a new form of building, a new style of architectural expression developed from conditions peculiar to our own times. That it may bear the ornamental detail of one or another historic period need not concern us greatly at this time, so long as this ornament is intelligently used, as in a great many instances it is.

A salutary influence of incalculable value in the sound development of modern architectural design is the compulsory study of mass and proportion brought about by the necessity for depending upon these elements for most of the character in present-day tall buildings. It makes the architect look beyond the familiar facade detail and see something larger and simpler. It makes a good basis, this mastery of mass and silhouette, for the development of a characteristic enrichment which may be expected to appear in the course of time. A condition that is doing more than any other one thing to force architecture out of the rut of stylistic precedent is the comparative thinness of the walls of steel frame buildings. With thin walls there are of course no deep reveals. The traditional styles, having been developed in heavy masonry construction, consequently, are not adaptable to modern steel frame buildings. This obliges the present-



Photos. Sigurd Fischer

The Arsenal Building, New York
Buchman & Kahn, Architects

Building at 550 Seventh Avenue, New York
Buchman & Kahn, Architects

day architect to seek other means of expression. Among these means are polychrome ornament, sculpture in low relief, and use of materials of interesting texture and coloring, and all these means are in use.

As has already been said, these buildings can be seen from great distances, but it is also true that they cannot be seen in their entirety when one is at all close to them, which is another modern condition that is having its influence. A Greek temple, a Roman arch, a Gothic cathedral or an Italian palace could be seen in its entirety from a comparatively short distance. Usually there was an open space in front of it, or all about it. Our buildings are on narrow streets; we see them either as towers blocks or miles away, or as rows of shop fronts within a few feet. Consequently, there is no place for fine ornamental detail such as is found in the architectural work of the past. On the lower parts of our buildings one cannot enjoy the decoration because of the jostling crowds on the sidewalks, and higher up it is lost in the distance. Furthermore, on our canyon-like streets the lower stories need to be mostly of glass to admit light and protect window displays. The high percentage of glass area, not only in the lower stories, but throughout, is one of the important elements in modern architectural design. Steel is the greatest factor of all, for it is from the use of this material that most of the conditions touched upon here arise. Without steel we would not have tall buildings with thin walls and large areas of glass, any more than the people of classic times or the Renaissance or the eighteenth century had them. So this material,—steel,—has given us an entirely new basis for architectural design, and we have only begun to adjust ourselves to it. For the massiveness of masonry there has been substituted the lightness of a strong, slender framework which we enclose with the thinnest possible shell of brick, stone or terra cotta. To this we endeavor to apply our masonry traditions as well as we can, while we are becoming acquainted, in an artistic sense, with this new element in the field of architecture,—steel.

We have traveled a long way since the St. Paul Building, still standing at Broadway and Ann Street, was built some 30 or 40 years ago, its surface loaded with superimposed orders. Then came the idea that a skyscraper should be designed in the likeness of a column, with a base of lower stories treated with columns, a shaft of plain walls pierced with windows, with a cap consisting of the upper stories treated with columns or pilasters and surmounted by a massive cornice. That was an improvement, for it gave a better composition. Then after a considerable time came the Woolworth Building, with its emphasis upon verticality. More recently came the concept of the building as a pile of boxes, which is closer to the truth. We have finally stripped the thing down to its structural and practical elements, and have begun to develop designs from that basis,—a sound and logical method. In doing this, most architects are drawing upon the detail of the historic

styles for their decoration and ornamentation, while a few are endeavoring to create detail of a consistent character, original in conception and suitable in scale. It is interesting to note the variety in the method of treatment adopted by the architects of some of the important buildings recently erected or now under construction in New York. The building for the New York Life Insurance Company, Cass Gilbert, architect, which is now well advanced on the site of the old Madison Square Garden, is essentially modern but conservative in its design. The detail of historic character is skillfully incorporated in a building that meets present-day requirements. The Savoy-Plaza, McKim, Mead & White, architects, at Fifth Avenue and 59th Street, also reflects the architecture of the past in a skillful adaptation of an entirely different style. The Sherry-Netherland on Fifth Avenue, one block north of the Savoy-Plaza, Schultze & Weaver, architects, is still different, but in line with architectural precedent so far as form and detail are concerned. Still another building of traditional detail and modern massing, is the new Aeolian Building at Fifth Avenue and 54th Street, Warren & Wetmore, architects. All of these structures are notable.

A splendid example of a thoroughly modern commercial structure is the Park Avenue Building at Park Avenue and 32nd Street, Buchman & Kahn, architects. It consists of huge, simple, square-topped masses, stepped back and admirably proportioned. Its severity is relieved by the emphasis of vertical members and by the use of polychrome terra cotta in simple designs. Further relief is provided by the texture effect of brickwork laid in patterns in the spandrels and elsewhere to produce the desired areas of tone. The Park Avenue Building is a notable example of the new, the simpler, and the better method in the handling of the setbacks. Until quite recently there was a prevalent tendency to make the setbacks in such a way that the effect was scattered and restless because of the too great number of small masses. Our architects have chosen to solve their problems in a straightforward way, either using historic ornament or, as in the case of the Park Avenue Building, the simplest decoration, designed to harmonize with the structure. The tendency, prevalent in Europe, to invent unusual forms, often apparently for the sake of variety, has not yet appeared in this country. As a result, the work of our architects has commendable soundness. To American eyes, at least, most of the forms created by European architects of the present day are meaningless and ugly; they seem to have no good reason for being. So it seems much better to produce such admirable buildings as those already mentioned here, making proper and intelligent use of historic ornament, whether Aztec, Assyrian or Byzantine, or of the simplest of modern forms, rather than to strive for startling and bizarre originality. It is better taste and also better art.

Our architects have gone their own way, paying little attention to the modernist movement in Europe, though they have been cognizant of it from its in-

Office Building, 49th Street and Madison Avenue, New York
Buchman & Kahn, Architects

ception 30 years or more ago. Since the Exhibition of Modern Decorative Art held in Paris in 1925, Americans, both in the architectural profession and laymen, have shown a considerable degree of interest in contemporary European work. Undoubtedly, this interest has had an appreciable influence on American architecture of the present day, but this development has been both logical and natural through the meeting of conditions, rather than because of any direct outside influence. European designs are helpful principally as a stimulant rather than as a source of inspiration, for they are not usually assimilable. This may be because they are too essentially European, but it is more likely that it is because they are too strongly marked by individual mannerisms.

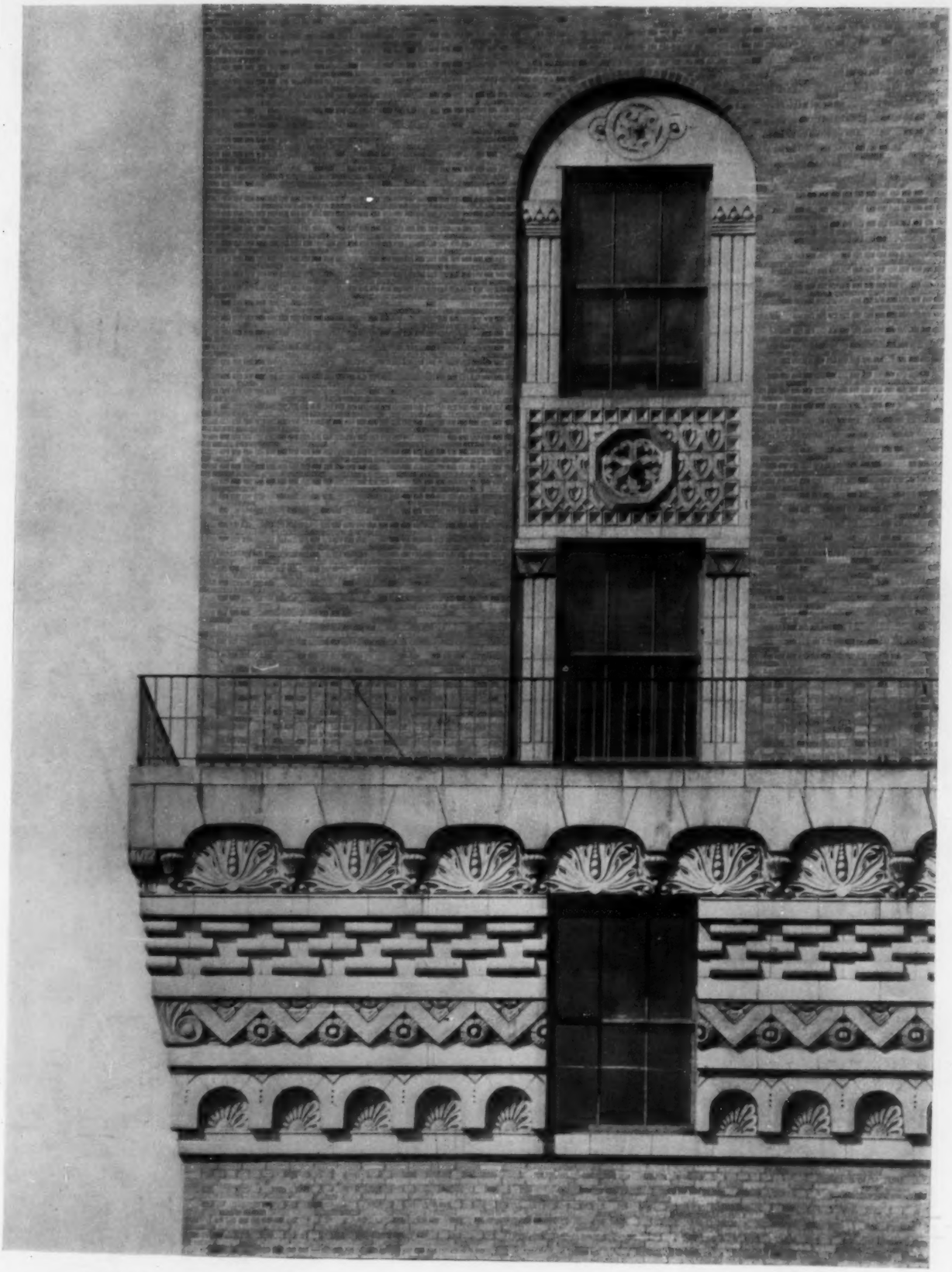
"Simplicity and honesty, in an attempt to express the particular problem in the most direct way, are prime essentials in modern architectural design," according to Ely Jacques Kahn, of Buchman & Kahn, architects of the Park Avenue Building and of other unusually interesting modern buildings. "This expression should be without any particular label," continues Mr. Kahn. "It should not simulate, for instance, a Renaissance palace or a Gothic cathedral, but simply be the outgrowth of the conditions, including the purpose of the building, the nature and location of the site, and the materials and methods of construction. One danger is in the tendency of people to assume that modern design is something that in itself must have a label. It is really only a matter of direct procedure without regard for conventions or precedent, when the latter happen to be wrong or not applicable. The purpose of the building is the first thing to consider,—structures for certain purposes must meet those purposes, and the design must be economically sound; it must lend itself to renting to advantage, for instance. A modern building should be essentially a piece of good engineering. Beauty is something that may come through the mathematical solution. This is the reverse of the theory upon which architects have been accustomed to proceed, for it means getting away from the idea that the building should belong, first of all, to some historic period or style,—that it need be Gothic or Renaissance, for instance. Starting with the selection of a style is the wrong way. It seems to me that the practical problem should be the source of the design. If one first gets beautiful massing, the detail is a secondary matter, and it will have a certain beauty if it is an honest thing. Of course a structure like the Park Avenue Building is purely a matter of construction with the great masses broken by line and color in a pleasing way. The main difference between the architectural detail of such a building and that of a structure of the traditional type is that this ornament is an integral part of the building, while in the other type it is something that is applied and may be removed without destroying the fabric. In this building the color is a definite part of the concept; the mass is considered as a whole and broken up with areas of color of sizes and shapes believed to be suitable to the scale of the building. This detail is derived from the surface of the material of the building; it consists entirely of pieces of the material in different colors, producing shadows or holes by their projection or by their being recessed. This is just the reverse of the usual method, which consists in deriving ornament from some other source and translating it into the material, as flowers for instance rendered into bronze or marble. This method is more like cutting into a block of clay and letting the cuts make the surface interesting; it is modeling the building itself, not adding extraneous decoration to it. Color has been used on this structure in place of carving. At a great height the effect of fine carving would be lost, but simple areas of plain color or tone of suitable size are effective at a distance."

Modern buildings are seen under conditions different from those affecting buildings of other times; they are surrounded by a conglomerate mass of structures and need to be simple and strong in design to offset this confusion and to have proper dignity. The materials we use for the outer surfaces of our buildings, while not perfect, will probably not be displaced by any other materials in the near future. For this purpose, which is to form the enclosing shell of a building, a flexible material is needed. Brick, terra cotta and stone answer this requirement; they are supplied in blocks that are small enough to be handled easily. Some kind of burnt clay is the best surface material for building, since it is fire-resisting. Metal is not suitable because it expands and contracts with changes of temperature. There has been much in the newspapers about proposed buildings entirely of glass and steel, but glass used in this way is unsuitable because of the great loss of heat and because of trouble from condensation on its surface. Also, those who propose buildings entirely enclosed in glass evidently forget the need for walls in which the necessary pipes of various kinds could be enclosed.

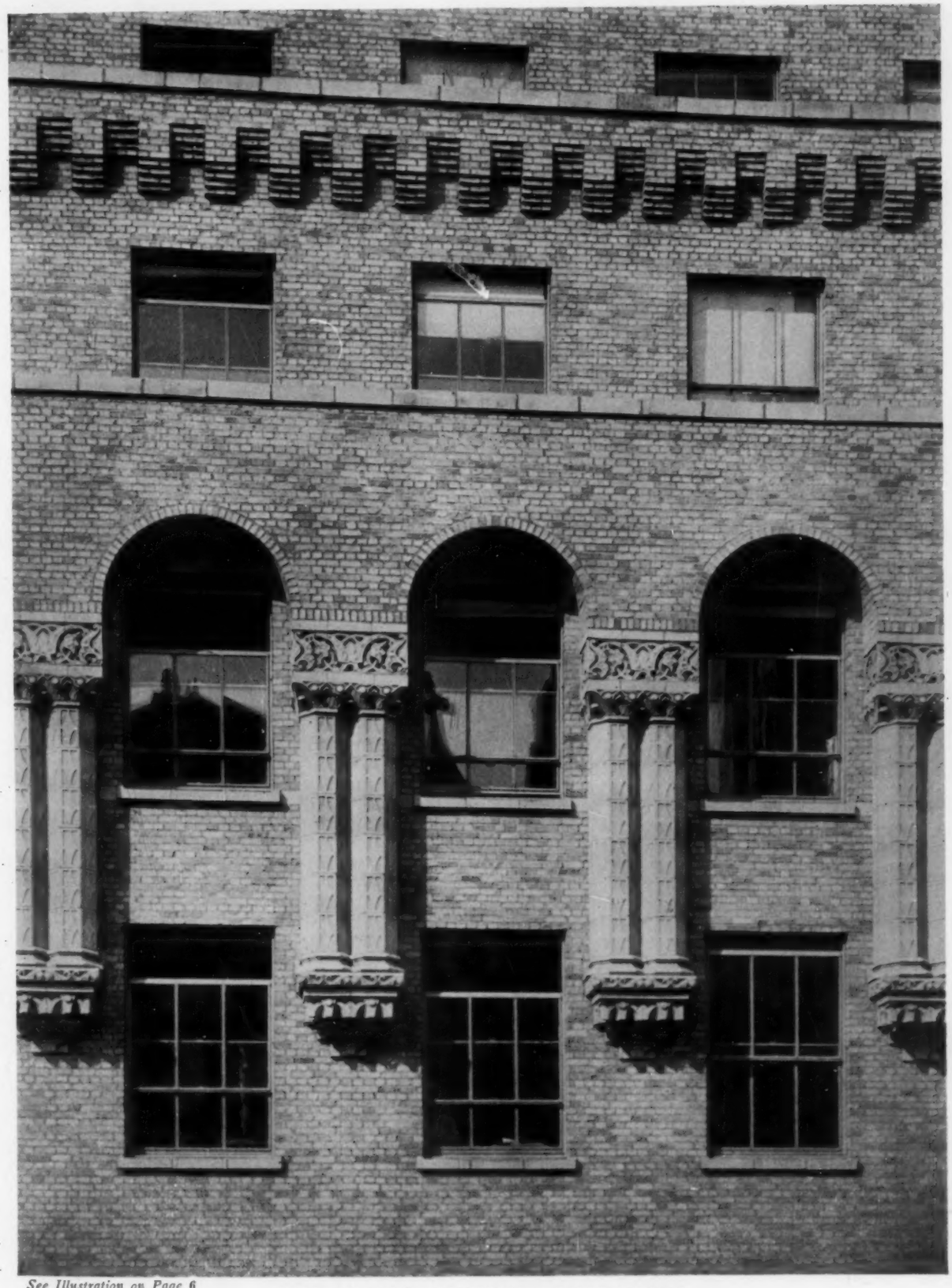
Several of the younger modern French architects have attempted to design tall commercial buildings in which heavy glass blocks are to replace brick and terra cotta as the material for the exterior walls. It might be an interesting experiment to try for once enclosing the sides of a tall building with glass blocks, the resulting effect of which would undoubtedly be bizarre and startling. The steel framework of the building would naturally show through the glass blocks, and the effect as a whole would be as bare and naked as a bleached skeleton hanging in a doctor's closet. Because the bone and sinew of the modern skyscraper are its steel frame, it is neither artistic nor advisable to leave its joists and columns exposed on the outer walls. The "skin" of a building, although constructed of masonry, should be as flat and thin as possible, and should express color and texture, as in a fabric or textile. In the endeavor to originate and create a style of architectural decoration sufficiently flat in feeling but brilliant in design, a distinctly new type of ornamentation is being created by several of the leading younger American architects.

Photos. Sigurd Fischer

NEW YORK FURNITURE EXCHANGE BUILDING
BUCHMAN & KAHN, ARCHITECTS

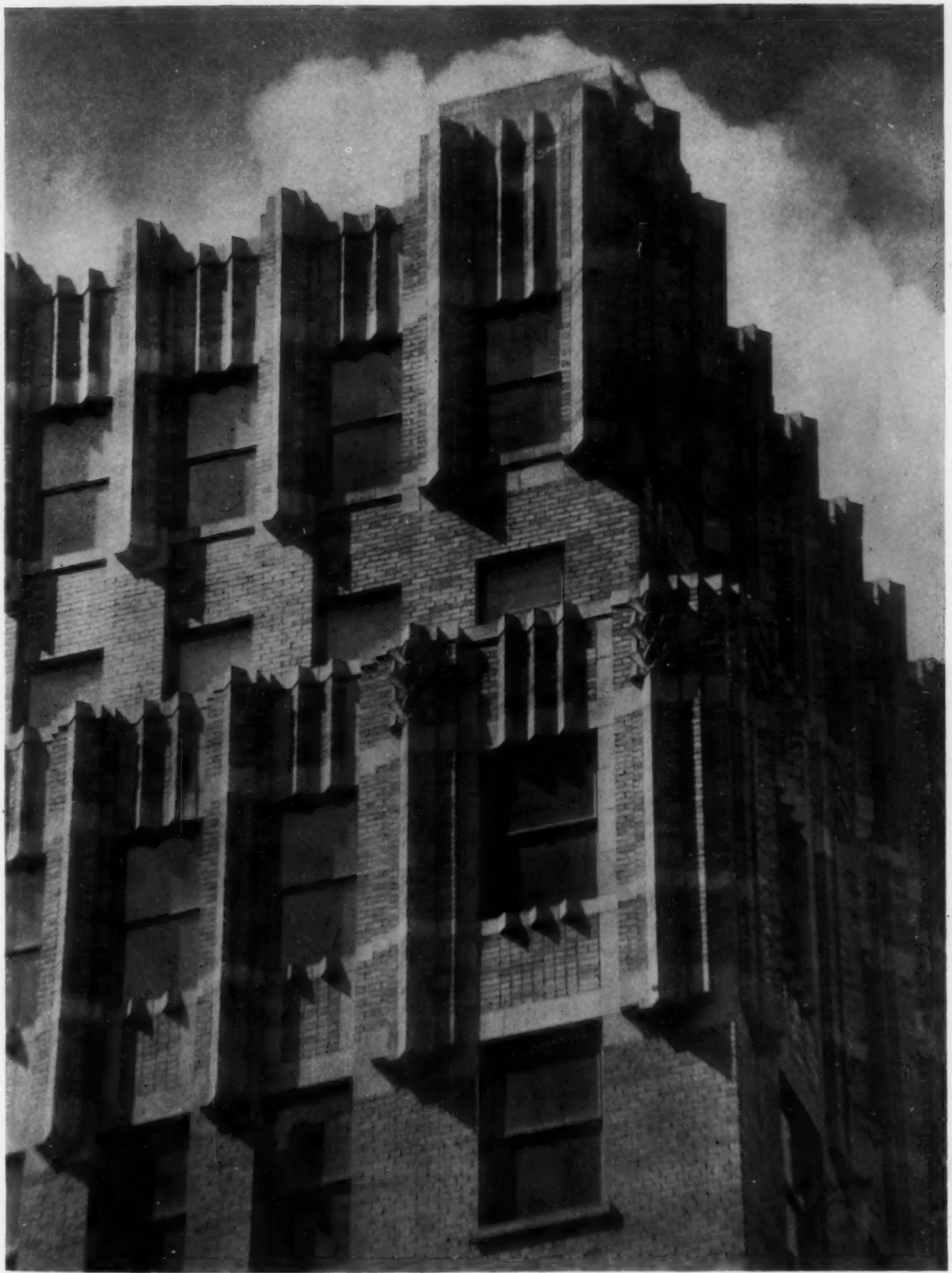


DETAIL, TERRA COTTA CORNICE, NEW YORK FURNITURE EXCHANGE BUILDING
BUCHMAN & KAHN, ARCHITECTS



See Illustration on Page 6

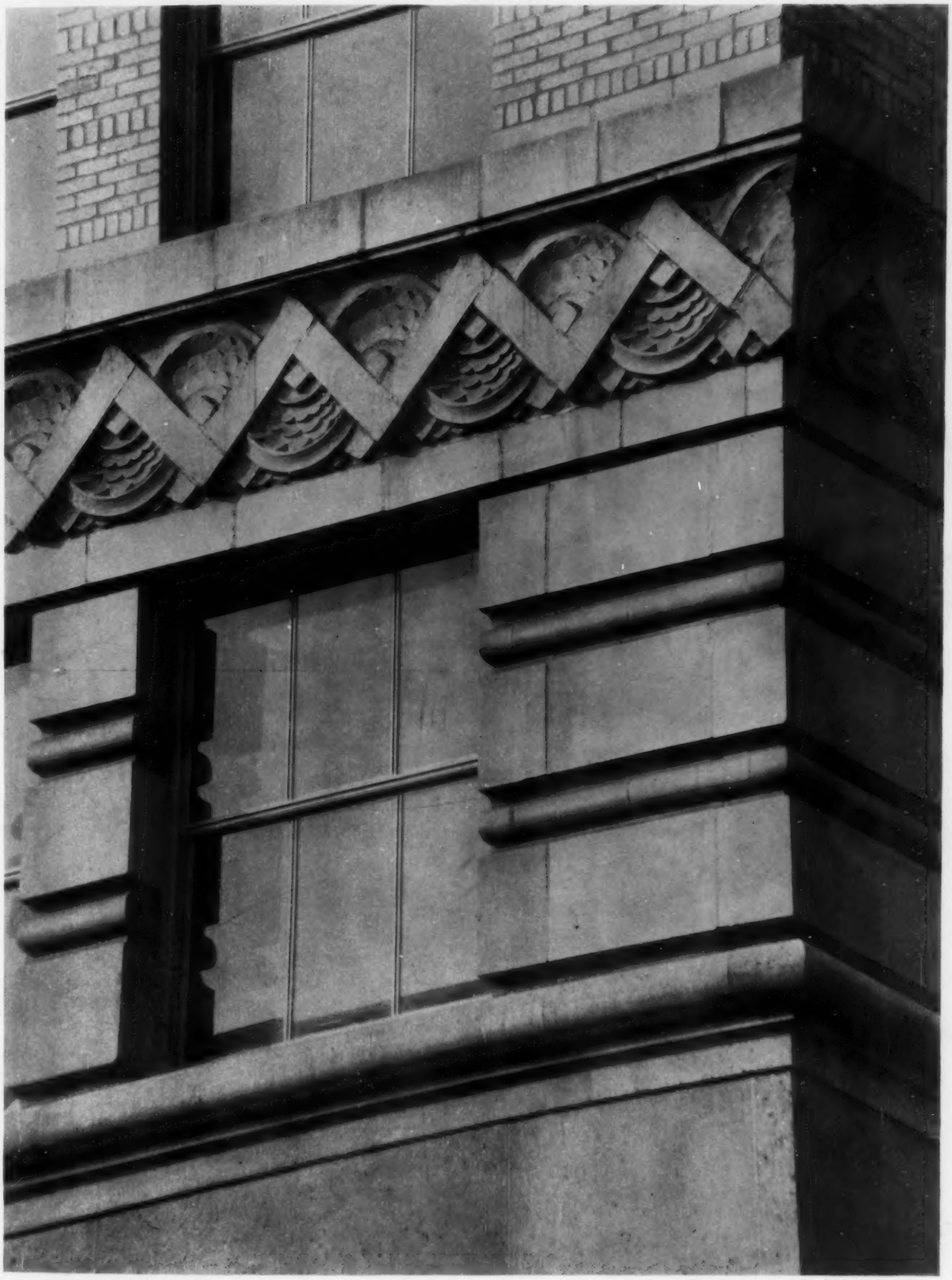
DETAIL, ORNAMENTAL ARCADE, FIFTEENTH STORY
OFFICE BUILDING, 550 SEVENTH AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



See Illustration on Page 7

MODERNISTIC DECORATION IN BRICK AND TERRA COTTA
OFFICE BUILDING, 49TH STREET AND MADISON AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

INSURANCE CENTER BUILDING, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



DETAIL, TERRA COTTA BELT COURSE, INSURANCE CENTER BUILDING, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

From a Rendering by F. G. Stickel

NEW YORK LIFE INSURANCE BUILDING, MADISON SQUARE, NEW YORK

CASS GILBERT, ARCHITECT

Photo. Wurts Bros.

NEW HOTELS AT 59TH STREET AND FIFTH AVENUE, NEW YORK

SHERRY-NETHERLAND
SCHULTZE & WEAVER AND BUCHMAN & KAHN, ARCHITECTS

SAVOY-PLAZA
McKIM, MEAD & WHITE, ARCHITECTS

AN AMERICAN CHURCH

The Reformed Church of Bronxville, N. Y.

HARRY LESLIE WALKER, Architect

BY

KENNETH KINGSLEY STOWELL

THERE are those who maintain that in the criticism of architecture, or in its appreciation, it is a mistake to give architecture the attributes of human character, and who maintain that architecture must be judged on æsthetic or on intellectual grounds only. Yet we find that the average mass of laymen criticize architecture or appreciate it only in terms of such attributes, as a building seems to possess qualities of dignity, repose, grace and honesty.

When the reaction to architecture is so universally translated into terms of human character, it seems that there must be some truth and reason for it. It is sometimes claimed in this connection that buildings can have no such characteristics; that, after all, it is merely a question of traditional association in the mind of the beholder. Even though we should grant that this is true, when we seek the reason we find that church architecture must of necessity be associated with religious feeling or a direct expression of it. Inasmuch as the religious architecture of the world has sprung from man's instinctive need for worship and organized religious activity, it is only natural that the forms derived from this origin should always be associated with religious expression. There are few who will deny that the great French cathedrals are the greatest concrete expression of organized religion. It is not to be denied also that the parish churches of England are endowed with the spirit of community life and its aspirations. There is hardly to be found a more expressive architecture. In the minds of all who have seen these small churches there is the distinct realization of the calm, simple, direct, and sincere religious feeling of the people of the English rural districts.

The Reformed Church of Bronxville reflects all the attributes of the English parish church,—its dignity, its repose, its staunchness and its charm. Yet this church has a distinctly American feeling which is probably due to those variations in mass, line and detail that are instinctively felt by the architect, but which are exceedingly difficult to analyze. It is rare to find, even today when the quality of architectural design in America has attained such a high standard, a church that produces on the mind of the beholder, whether layman or architect, such an impression of complete fitness and rightness. One feels instinctively in this church that its architectural expression is the result of a sympathetic understanding on the part of the architect which is expressed in every detail of its design, from its mass and proportion to the smallest ornament. The fact that the architect was designing the church in which he was to worship, in fact *his* church, is evident here. The church possesses qualities that could not be the work of an architect who considered the building merely another commission or just a business proposition or an effort to give the client a church for a stipulated price, a practice often evident in the result.

There were several architects in the congregation who naturally were anxious to have an opportunity to design the new church. The congregation decided that it would be desirable for obvious reasons to hold a competition for the choice of an architect, and the building committee appointed Alexander B. Trowbridge architectural adviser to conduct the competition. The six architects who submitted drawings were, Joseph J. Clark, Tooker & Marsh, Harry Leslie Walker, O. J. Gette, Francis A. Nelson and Allen & Collens. Not all of these were represented in the membership of the church. Realizing the unnecessary burden often placed on architectural competitors, Mr. Trowbridge drew up the competition program in accordance with the standards of the American Institute of Architects, and called for as few drawings as would adequately present the ideas and abilities of the designers. The plans, elevations, and sections were all at the scale of 1/16-inch to the foot, and the perspectives were denied the accessories of colors, shadows, trees, etc., in order that the architecture itself might be judged rather than the beauty of the rendering. The design submitted by Mr. Walker was selected by the jury as being the best.

The ample site of this church is exceptionally well located at the juncture of two wide thoroughfares. The hill on which the church stands commands a view of the wide lawns of the school group across Pondfield Road. The sturdy tower with its graceful detail is naturally and appropriately placed and can be seen from all approaches. The architect was not unmindful of the enhancing beauty of the old trees the site afforded, and the way in which he took advantage of them in his planning amply repaid the effort, as a glance at the illustrations will show. In coöperation with Arthur F. Brinckerhoff, the landscape architect, additional planting was carried out to make the whole a fitting and harmonious setting.

The Bronxville Church was formerly housed in a wooden building of moderate size where the people of the community worshiped for some 75 years. The site on the hill had come to have a sentimental significance with the entire congregation. It was desired that the church should continue without interruption to worship as it had in the past, on the same ground even while the new church was being erected. In the preliminary studies Mr. Walker kept this in mind, and this desire became an accomplished

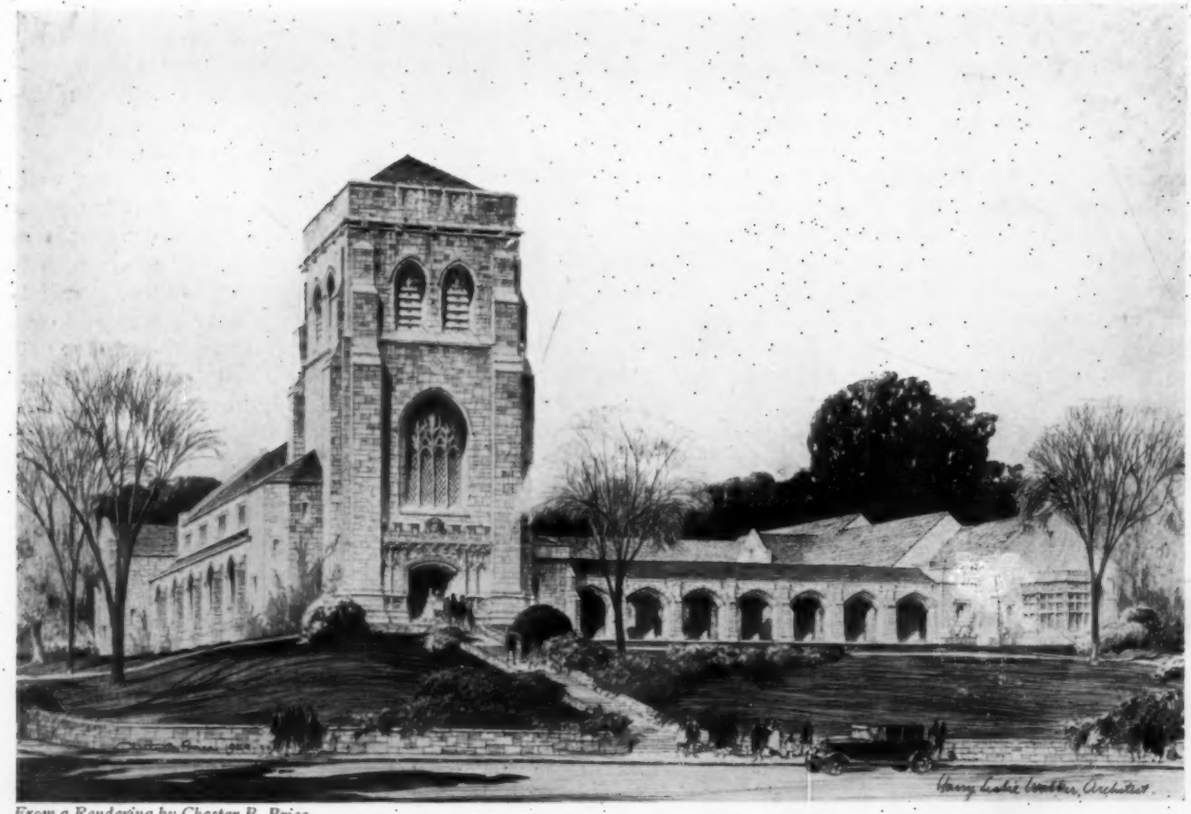
Photos, P. A. Nyholm

The Lectern

fact by delaying the demolition of the original building until a portion of the new structure was ready to be used for services. The old church building was left on the portion of the site now used as the cloister garth until the Bible School Hall could be used.

It is particularly the plan and arrangement of the Bronxville Church that are most distinctly American. Perhaps in its plan it does not differ materially in its requirements from many other Protestant churches, but in its arrangement it seems to be one of the most successful and workable, as well as most pleasing. The fact that the various portions of the Bible School have been arranged so that they do not interfere, does not preclude the easy access of one group to the other, or the assembly of all the groups in the main hall for such services as may require the attendance of all the departments of the school.

The church is distinctly not an institutional church, although it is essentially a community church. The various institutional adjuncts, such as gymnasium, swimming pool, and provision for other social and extra-religious activities were not considered a part of the church work. It is in purpose a spiritual and religious church. As the teaching of the Bible is necessarily an important part of the program, the portion of the church group devoted to this work has been very successfully planned for its various divisions in accordance with the most recent and approved ideas. The arrangement of the plan separates the church proper from the Bible School in



From a Rendering by Chester B. Price.

Preliminary Perspective, Reformed Church, Bronxville, N. Y.

Harry Leslie Walker, Architect

an excellent way, taking into consideration that the Bible School activities are often held at the same time as the church services. They in no way interfere with each other and are nevertheless in sufficiently close conjunction for all practical purposes.

In the hall of the larger Bible School an excellent workable solution has been achieved. The classes, meeting in the central part for the opening or closing exercises of the school, easily take their places in the classrooms on either side for their class work and are secluded from one another by folding doors and from the main portion of the hall by heavy curtains. The hall itself loses nothing in its attractiveness when the classes are meeting, and the arrangement of clerestory lighting insures adequate illumination at all times. Drawing the classroom curtains at the sides diminishes the apparent size of the hall when it is used for other gatherings than the Sunday study. The stage, while not elaborate, is adequate for such pageantry or dramatic work as may be a part of the activities on various occasions as may be desired.

The various parts of the Bible School have been arranged for their uses in the most adequate way. The little children of the kindergarten and those of the primary grades can enter through their own door at the front of the building without the possibility of disturbing the work of the intermediate or senior students. The junior department can reach its portion of the building on the second floor through an entrance from the court, without necessarily coming

The Pulpit

View from Pondfield Road, Reformed Church, Bronxville, N. Y.
Harry Leslie Walker, Architect

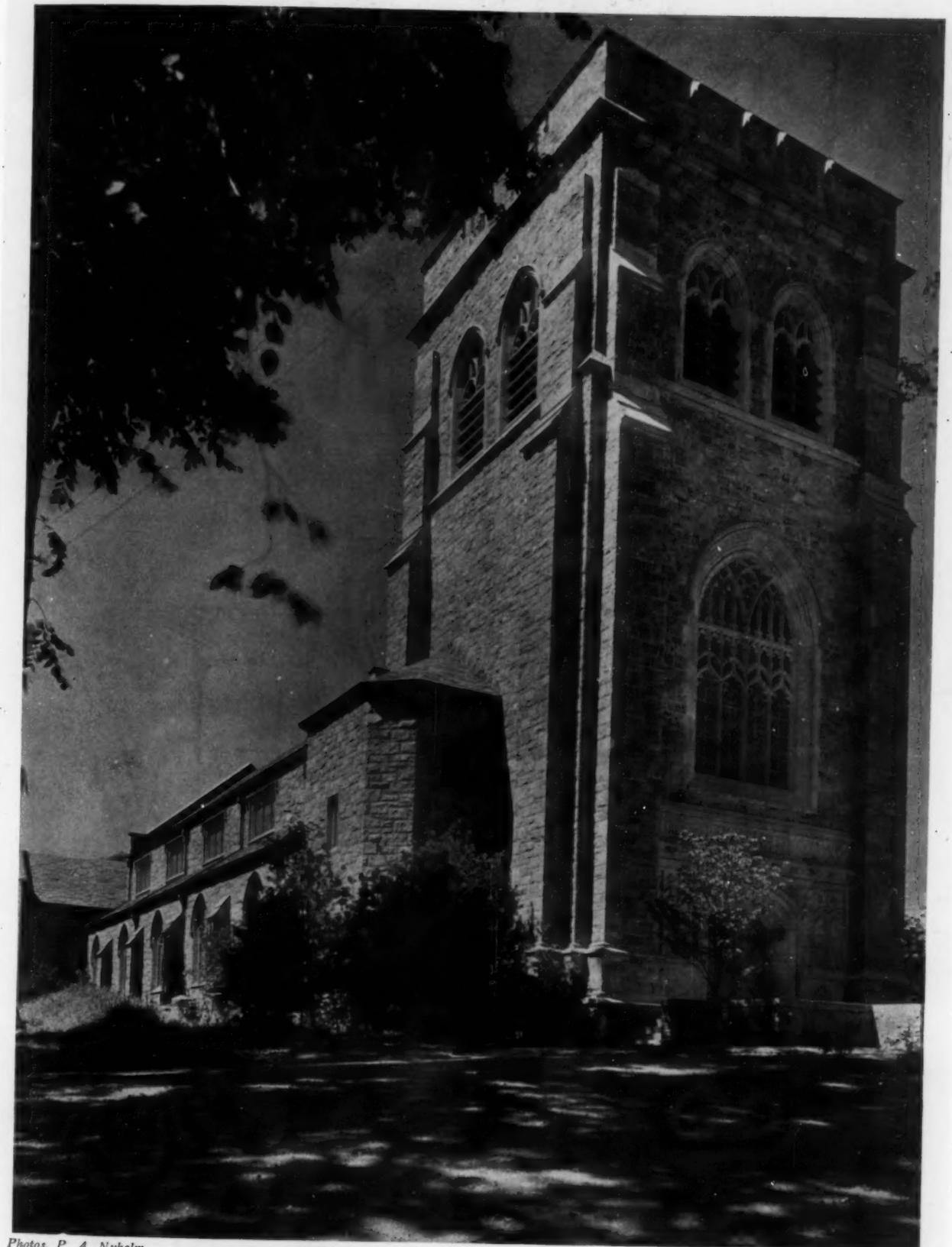
in contact with, and certainly without interfering with, the activities of other groups of the school. The plan has been very carefully thought out and is extremely well adapted to the purposes of the women's organizations that meet for religious purposes and missionary work. It will be noted that the large hall can be used for the assembly without interfering with the arrangements for the subsequent work of the organization or with the serving of luncheon or refreshments when the time comes. Either the large hall or the men's and women's social room may be used for work, or for luncheon or tea, as both are connected with the kitchen. Adequate storage space is provided for the materials and accessories of the work. The arrangement of entrances and exits makes possible the use of any portion of the building for its various functions, and when one portion is in operation the other portions can be very easily closed from communication. The location of the room of the church secretary is perfect, accessible as it is to every part of the building on account of its central location. The pastor's study is directly over the secretary's room, which is in a secluded portion, as it should be, yet in close communication with both the church proper and the large hall. A small room is provided near the pastor's study for the visiting pastor or assistant pastor or for use as a robing room.

The Font Cover
Harry Leslie Walker, Architect

The interior of the church itself has a very real religious atmosphere. It is dignified without being cold, as is often the case in churches designed in a Georgian manner. One feels the warmth, repose, and the dignity of its purpose, without losing the intimacy and charm of its communal character. The low Norman piers of the arcades have been placed adjacent to the aisles in such a way as not to interfere with vision. Above them is the clerestory, which provides additional light to the center of the nave. The open trusses are of most pleasing form and are in excellent scale and harmony with the whole interior. The woodwork of the church is exceptionally fine in proportion and in interest of design and evinces the same feeling for beauty in form and line that characterizes every detail of the church. Particular care and study are shown in the chancel, the pulpit, lectern and font cover,—study that insured correct proportions and relations of parts yet which retained the spontaneity and interest of the design.

The exterior design cannot be assigned to a particular period style of architecture, because of the distinctive handling of mass and void as well as of detail. In spirit the design is akin to the English Perpendicular for the most part. The splendid tower window has the distinction of this style in its tracery, as does much of the other stonework and carving. The segmental arch of the main door is a note hardly to be found in doorways of the English parish churches, which were more often four-centered. The tracery paneling which enframes the doorway is not an unusual feature, as it has its prototype in some of the late Perpendicular porches of East Anglia churches, yet the treatment is quite individual. The design of the exterior is restrained, and the detail and ornament serve to increase the strength and vitality of the large, well proportioned areas of interesting stone.

Chimes have been installed in the tower. The music of the bells may well produce in the hearts of the neighbors the same feeling as the curfew when the "ploughman homeward plods his weary way." The business man and the housewife are no less susceptible to the feeling and the urge of the chimes than was the worker in the fields of rural England. As they pass, whether bound for the busy city or for market, the sight of the church is always satisfying to the eye and refreshing to the spirit, either in the morning sunshine, or with the moonlight filtering through the willows and elms and casting their impressive shadows on the rugged stone. At all times the Bronxville church is completely soul-satisfying.

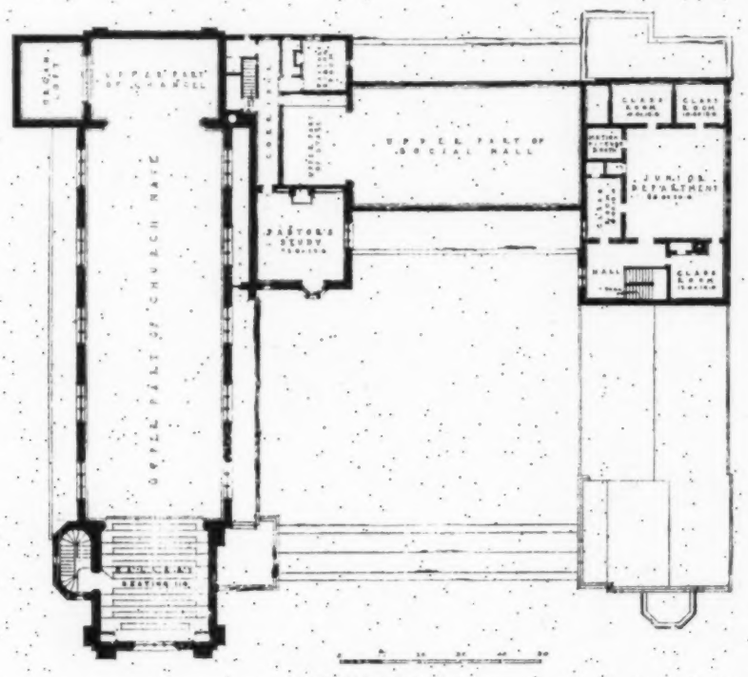


Photos. P, A. Nyholm

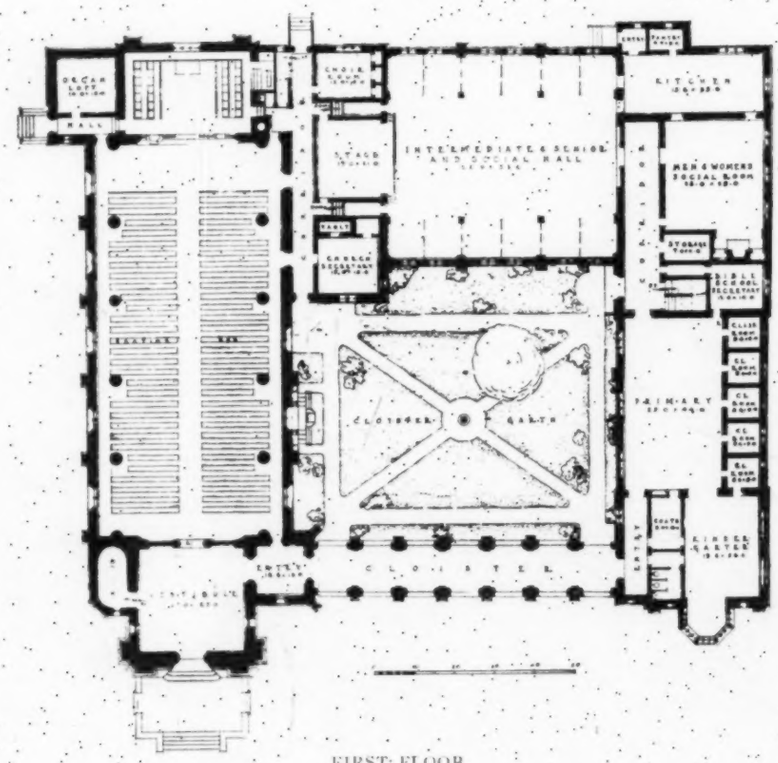
Plans on Back

REFORMED CHURCH, BRONXVILLE, N. Y.

HARRY LESLIE WALKER, ARCHITECT



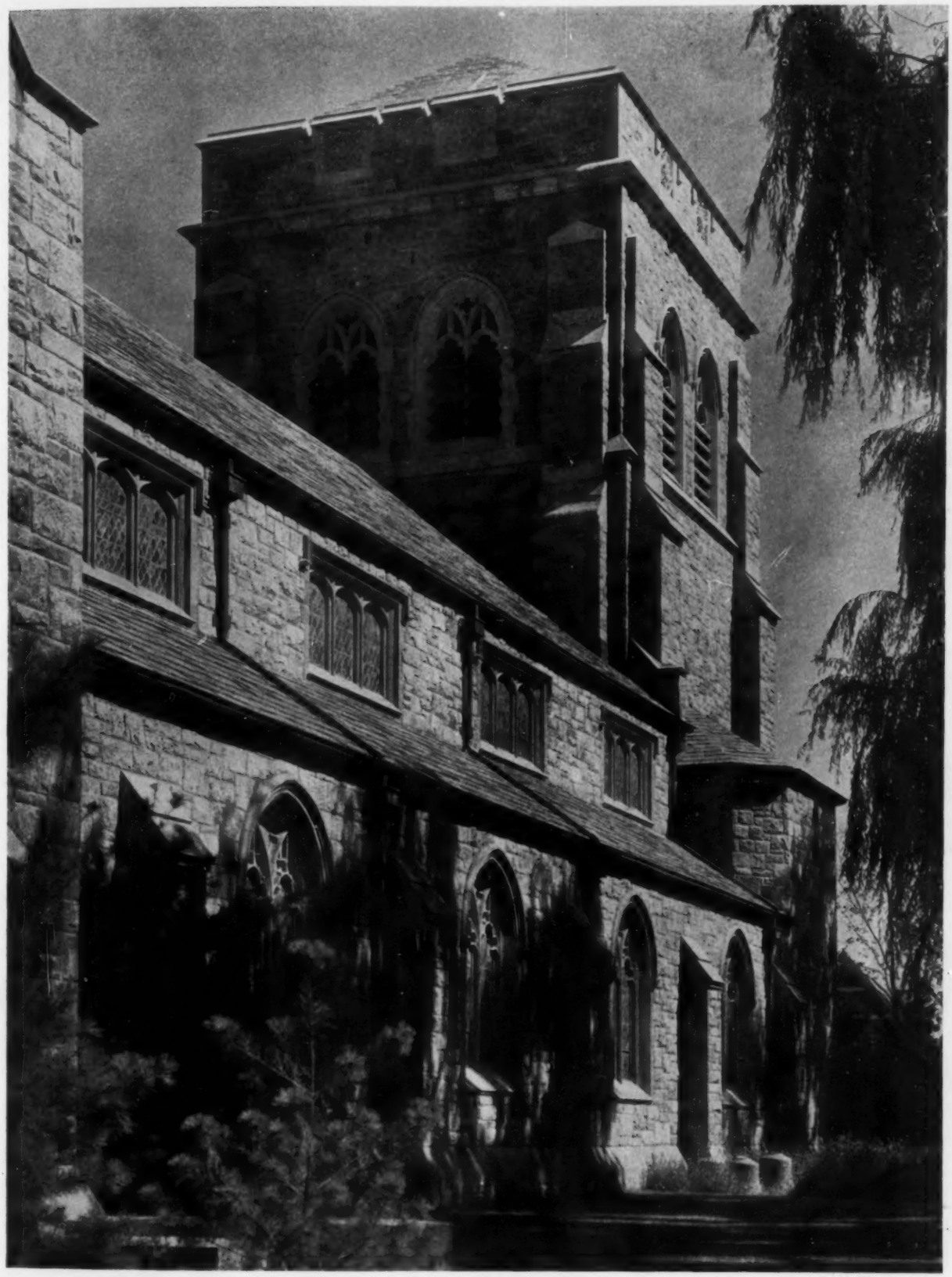
SECOND FLOOR



FIRST FLOOR

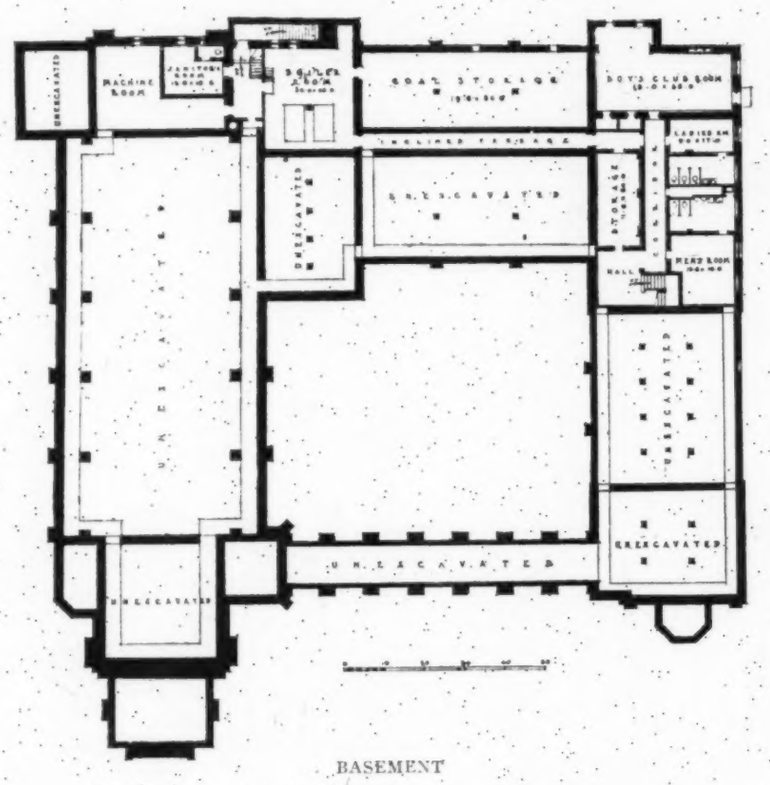
PLANS, REFORMED CHURCH, BRONXVILLE, N. Y.

HARRY LESLIE WALKER, ARCHITECT



Plan on Back

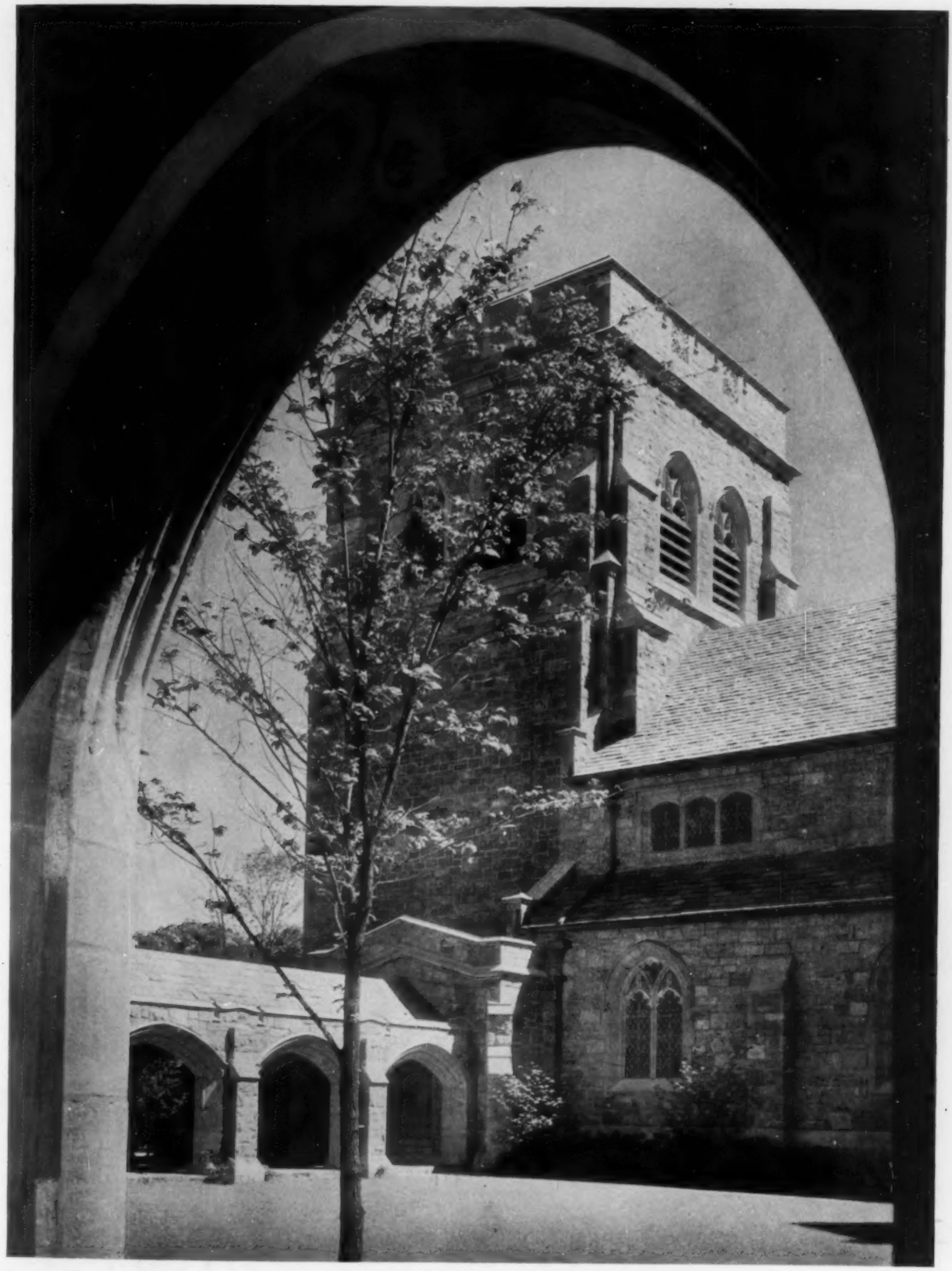
CHURCH AND TOWER
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT



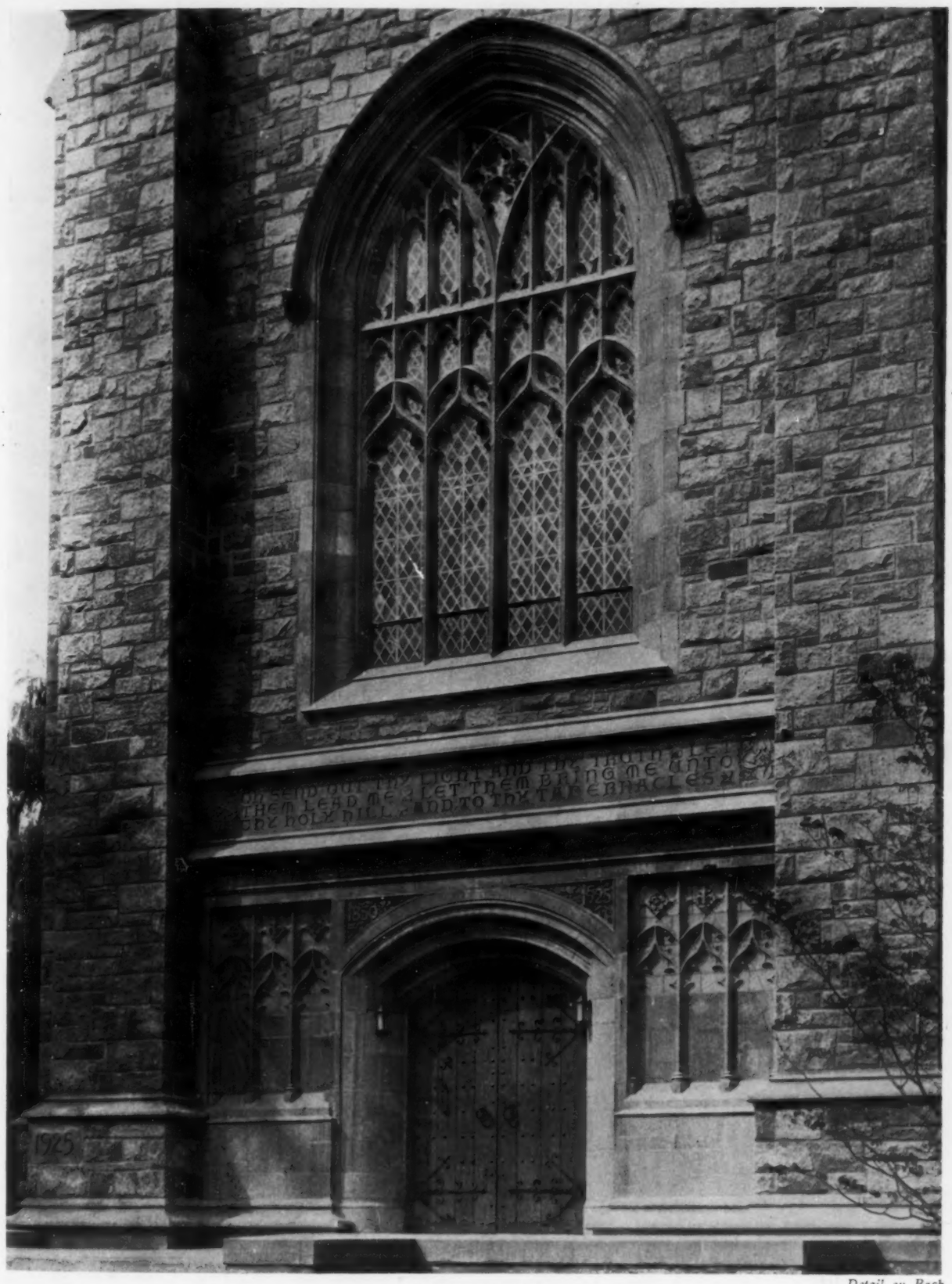
BASEMENT

PLAN, REFORMED CHURCH, BRONXVILLE, N. Y.

HARRY LESLIE WALKER, ARCHITECT



TOWER FROM CLOISTER GARTH
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT



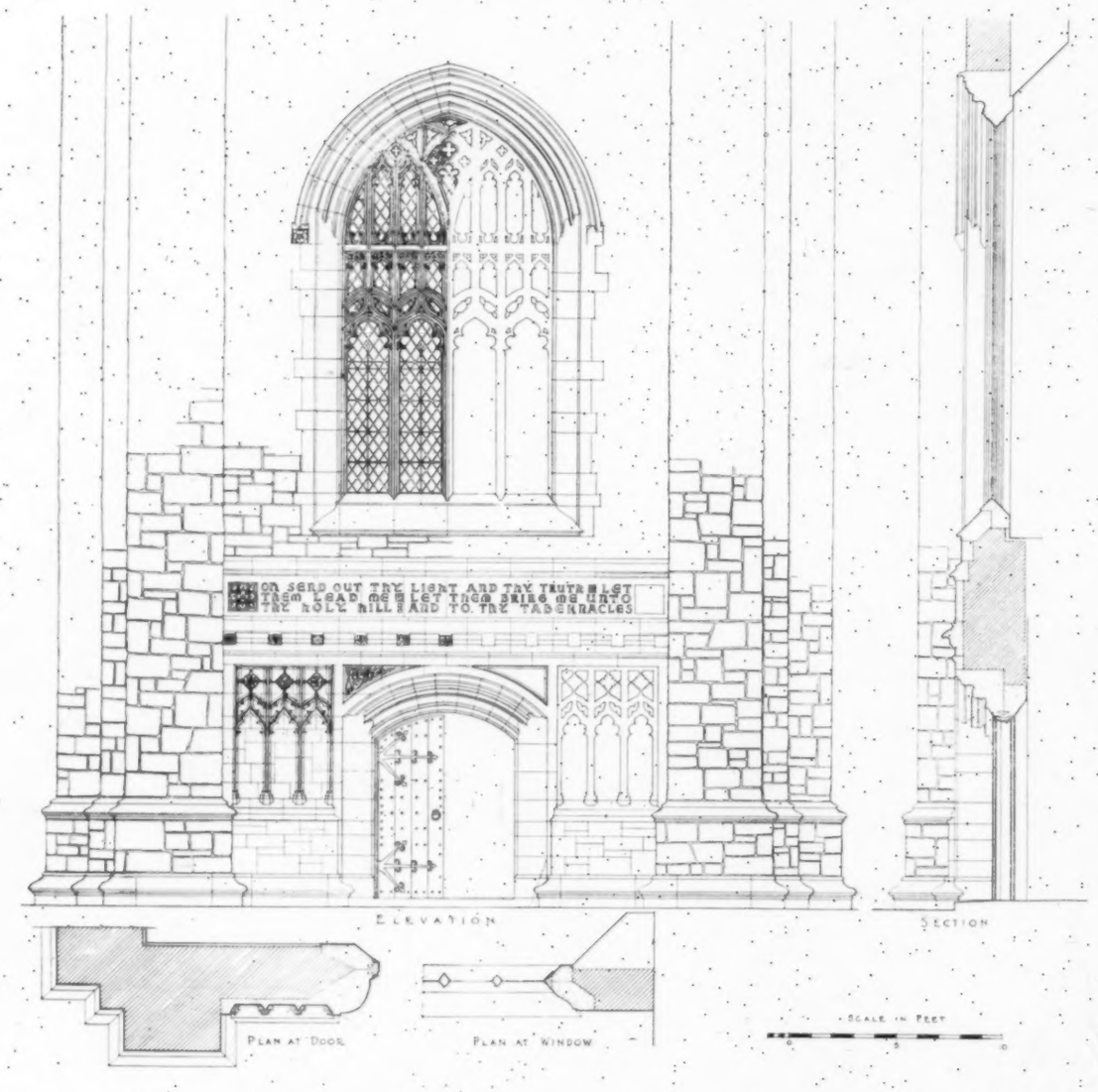
Detail on Back

MAIN ENTRANCE
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT

MAIN ENTRANCE OF CHURCH

REFORMED CHURCH OF BRONXVILLE, N.Y.

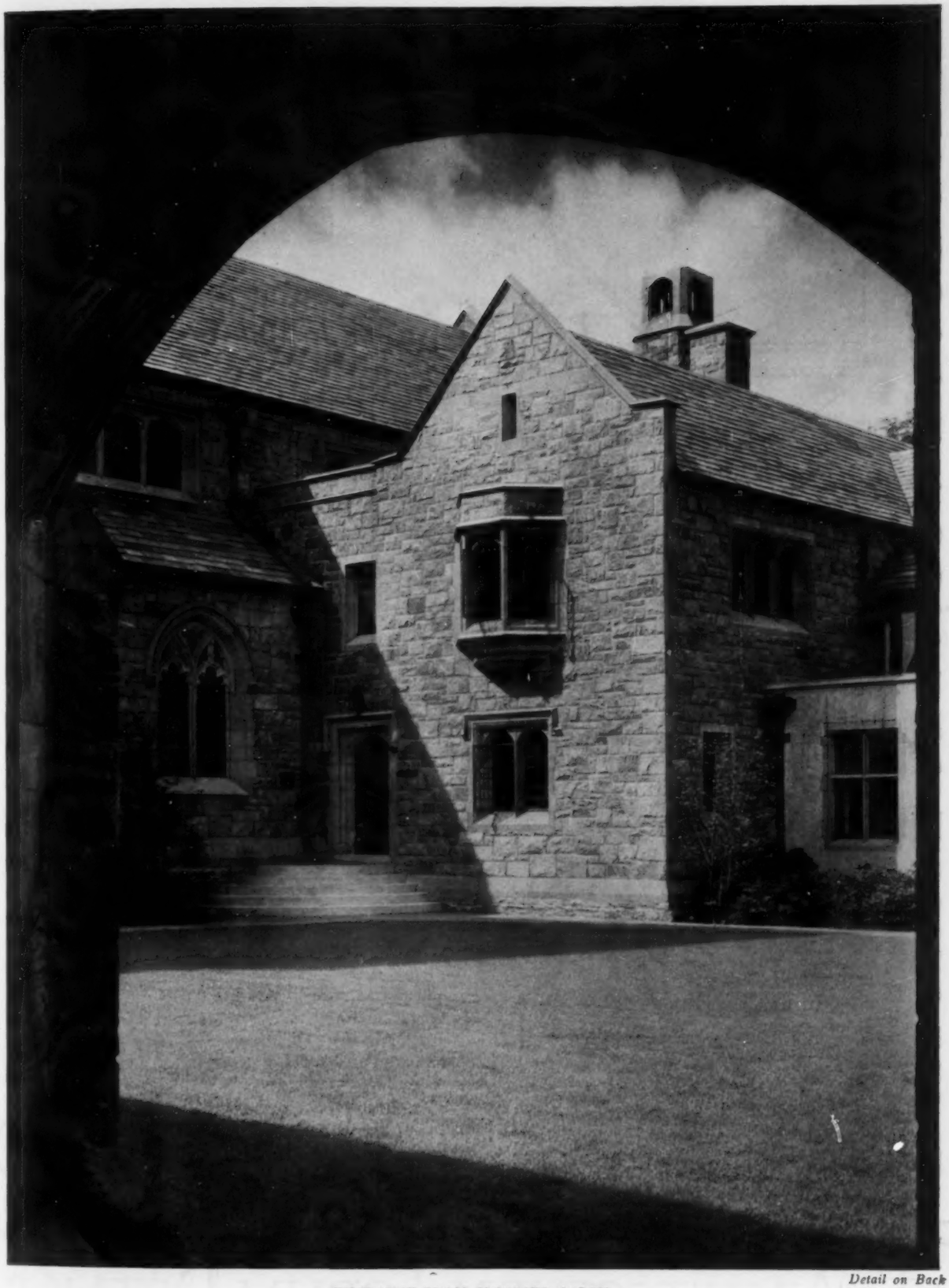
HARRY LESLIE WALKER ARCHITECT



JAN. 1928

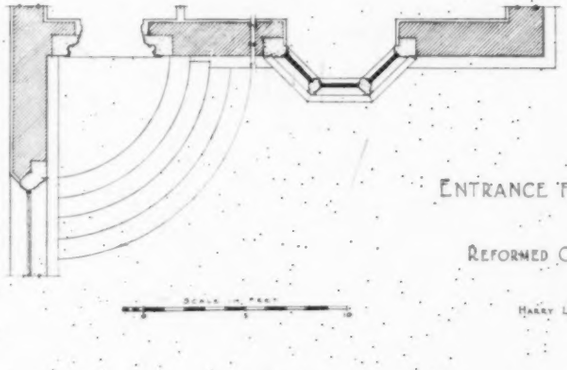
NO. 45

The Architectural Forum Details



Detail on Back

ENTRANCE FROM CLOISTER GARTH
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT



ENTRANCE FROM CLOISTER GARTH

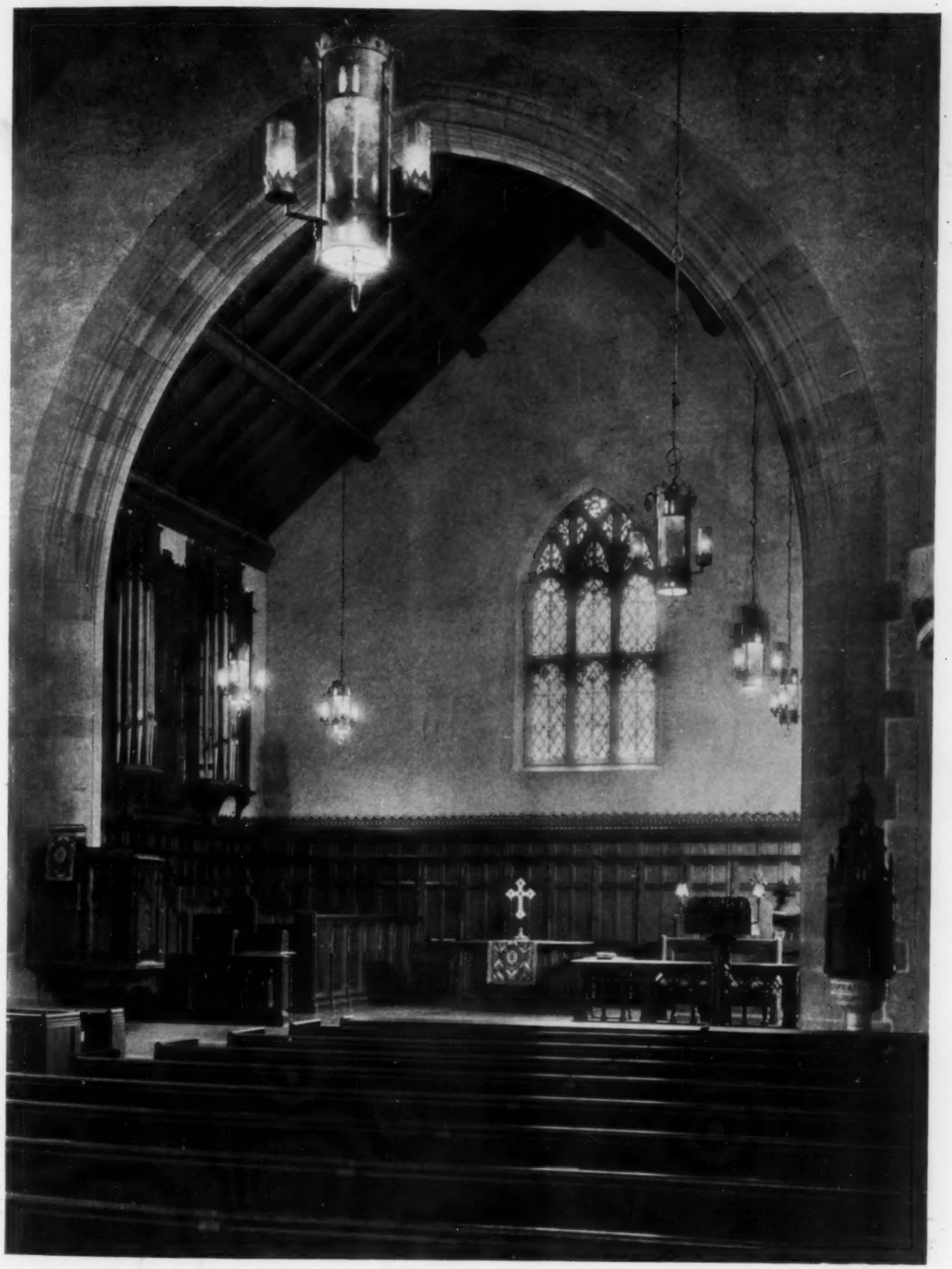
REFORMED CHURCH OF BRONXVILLE N.Y.

HARRY LESLIE WALKER ARCHITECT

JAN. 1928

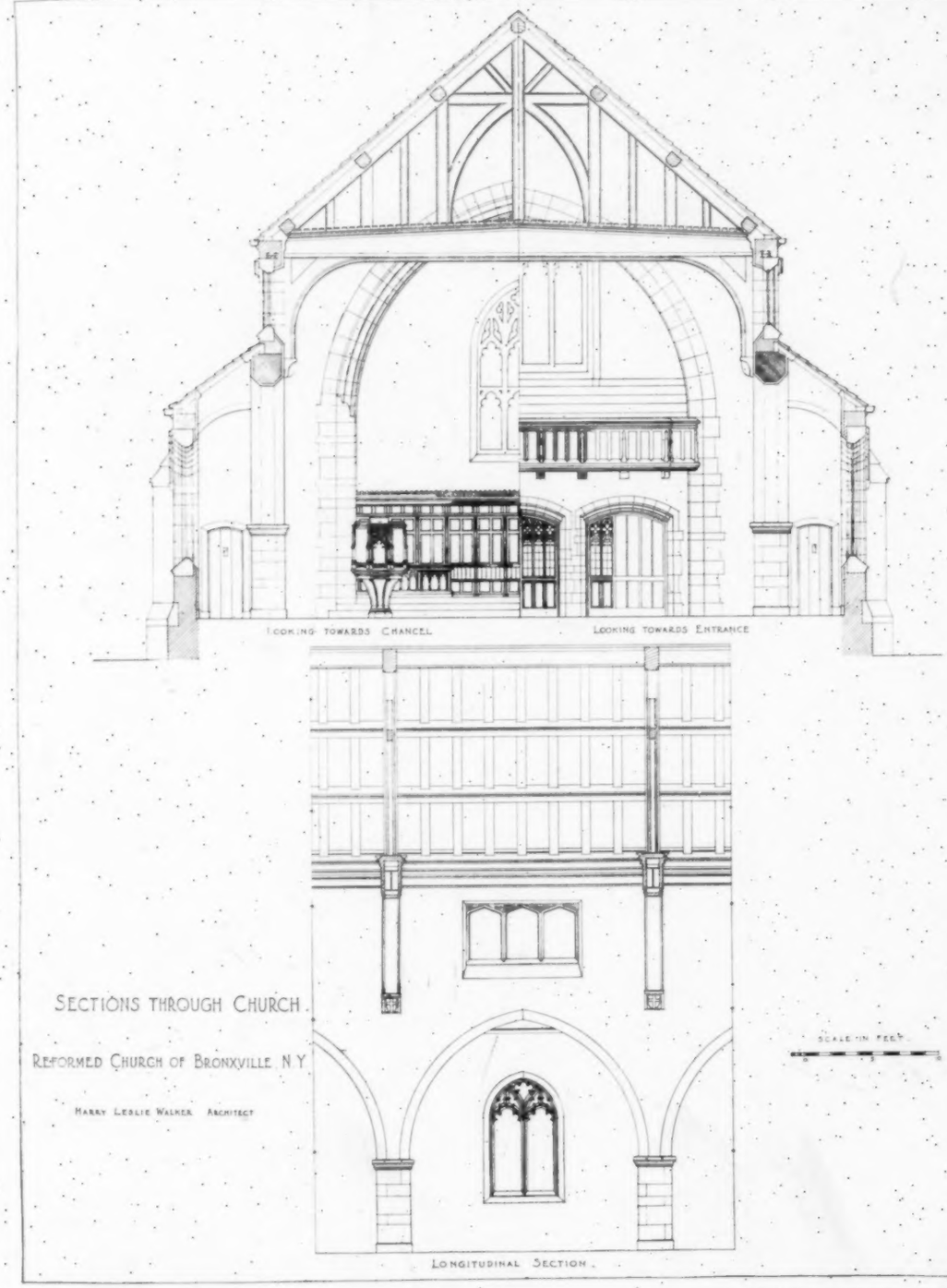
No. 46

The ARCHITECTURAL FORUM DETAILS



Sections on Back

CHANCEL
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT



SECTIONS THROUGH CHURCH.

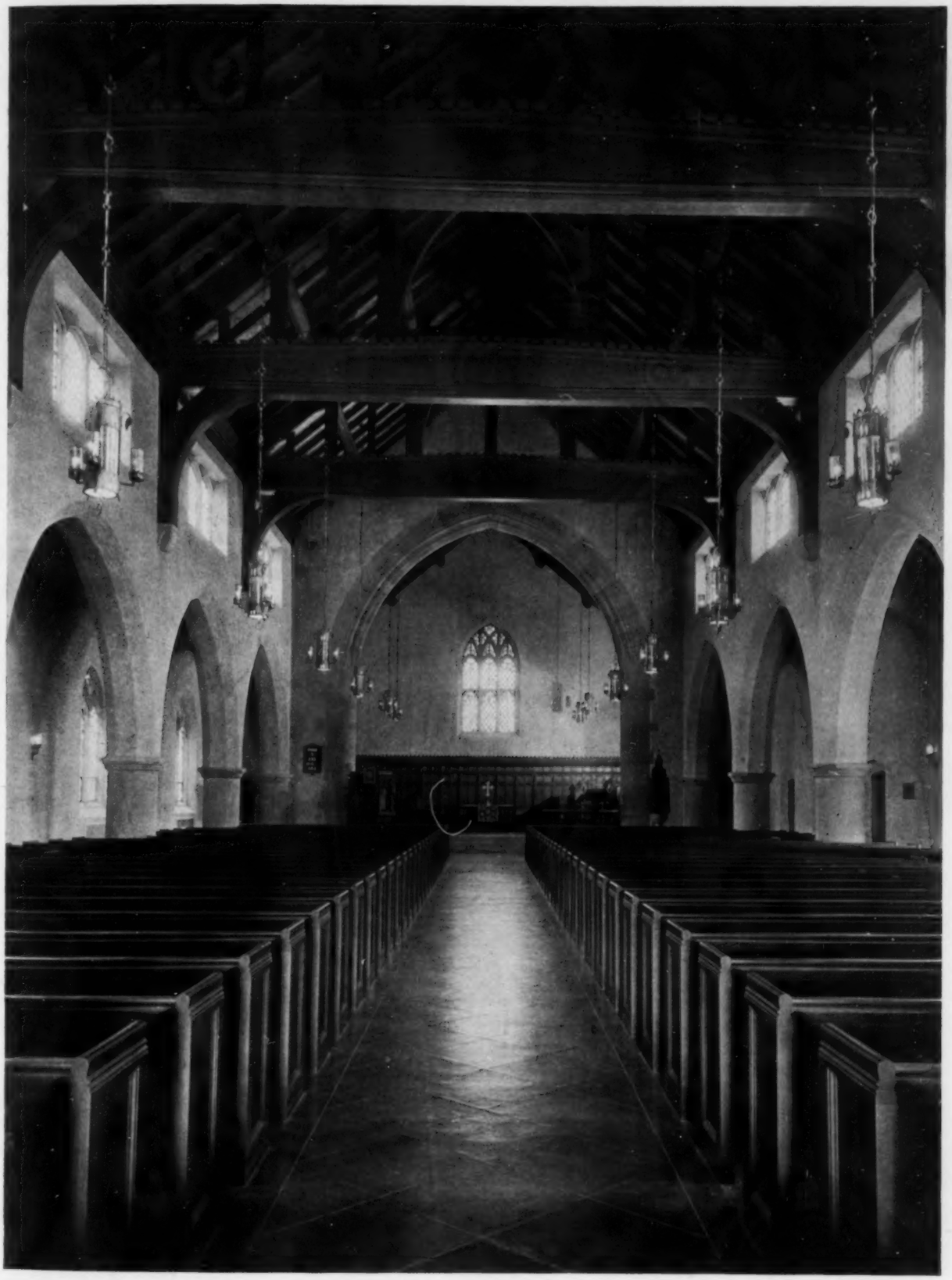
REFORMED CHURCH OF BRONXVILLE N.Y.

HARRY LESLIE WALKER ARCHITECT

JAN. 1928

No. 47

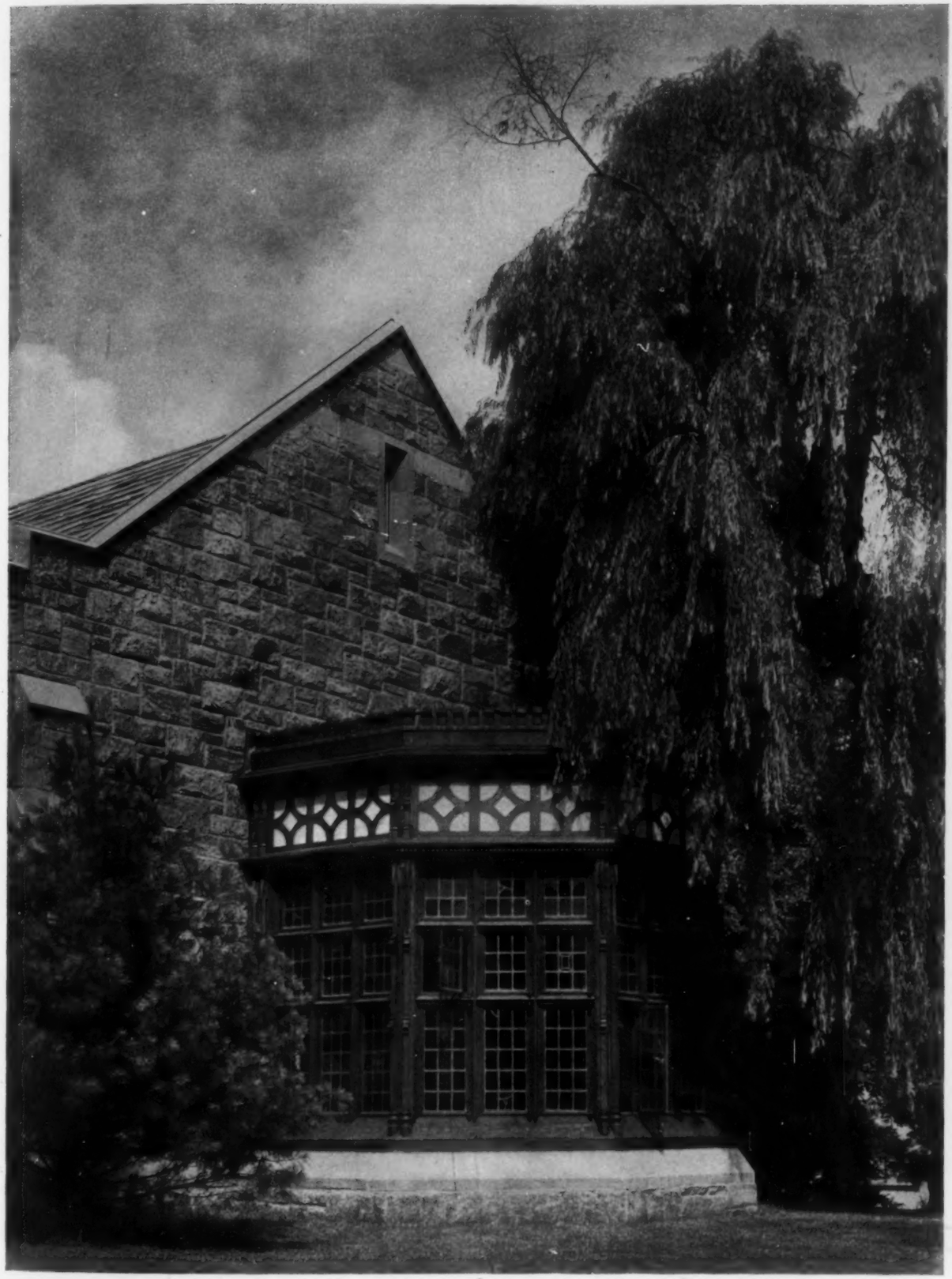
The Architectural Forum Details



THE NAVE

REFORMED CHURCH, BRONXVILLE, N. Y.

HARRY LESLIE WALKER, ARCHITECT



KINDERGARTEN BAY
REFORMED CHURCH, BRONXVILLE, N. Y.
HARRY LESLIE WALKER, ARCHITECT

A MODERN EXPRESSION OF REGENCY STYLE

BY

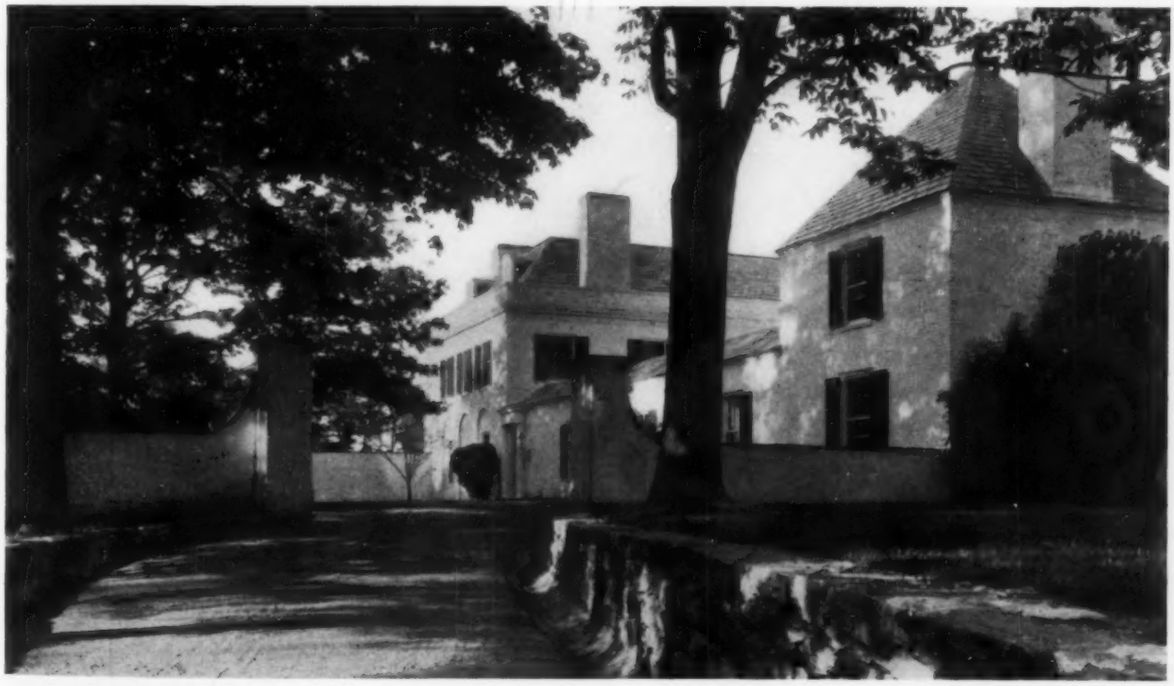
HAROLD D. EBERLEIN

INFORMED architectural tastes of our own day seem to have a peculiarly strong drawing toward the domestic modes of Classic type that held the field in both England and America at the very end of the eighteenth century and during the opening years of the nineteenth. Without entering into the psychological reasons back of this general preference,—and such reasons undoubtedly exist,—it may be pointed out that the course of evolution has as yet given us nothing better, nothing more suited in its main essentials to a faithful and sympathetic reflection of American ideals and habits of living.

There are, of course, the various so-called "romantic" or "picturesque" modes, culled and adapted from the traditional repertoires of England and France, of Italy and Spain. These are all of them admirable in their respective spheres, and it would be impossible to make any distinction in point of relative excellence between any one of them and the Classic, late Georgian phases already alluded to. But, in avoiding unwarranted comparisons, we must bear in mind that while the several "romantic" or traditional episodes referred to, or the current adaptations of them, may faithfully enough realize all the qualities and requirements of those whose temperamental bias favors expression in such forms, they fail utterly to satisfy the tastes of another equally numerous class,—a class whose temperamental bent is altogether toward the measured precision, the symmetry, and the nicely ordered elegancies of which the Classic manner, in some form or other, is the outward and visible sign and symbol.

For the inherently Classic-minded, then, the only type of architecture they can consistently live with, the only type from which they can expect to derive substantial and enduring satisfaction, must needs be cast in Classic mould. Elegance, simplicity and polished perfection are just as truly esteemed now as they ever were in the late Georgian period. And, after all, in spite of sundry superficial changes in outward manners, the fundamental outlook of ordered minds in matters of æsthetics is not materially different now from what it was in the early decades of the nineteenth century before a strange combination of romanticism and materialism had played havoc in the realm of popular taste. It is perfectly natural, therefore, that late Georgian qualities, by their fitness to current ideals, should awaken a responsive spirit of sincere appreciation in our own day. In other words, the later phases of the Classic manner have in them the aptitude for being entirely modern and wholly suited to use today.

Of this perennial flexibility and readiness for fresh interpretation no better example could be desired than the house at Purchase illustrated here. There are critics of a certain stamp who affect to regard the use of any eighteenth century architectural type or manner of furnishing as an unnatural effort



Entrance Drive, House at Purchase, N. Y.

Leigh French, Jr., Architect

Main Entrance Door

to thrust the living into the shells of departed generations, a forced attempt to galvanize archæology into renewed youth and vigor. It must be admitted that instances of mummified architecture and decoration are not wanting to give color to their contentions.

This house began, as houses should, with the plan. Hence the vital quality that comes only when the structure is devised to fulfill accurately and exactly the requirements for which it is designed. The elevations grew naturally out of the plan and did not originate in a pictorial preconception into which the plan had to be fitted by hook or by crook; the latter procedure is fatal to vitality, especially when the Classic pictorial conception is limited to a cubic mass, with or without lower flanking wings, and equal room divisions at each side of a central hall. Treat the Classic manner as a living, flexible thing and it will live and bend itself to the demands of each occasion. It will likewise furnish untold opportunities for fresh and interesting composition, as the result here presented indicates. Although the plan shows an absolute departure from the stock symmetrical and equi-divisional plan, which on this side of the Atlantic has become almost a fetish of Classic orthodoxy, the elevations display all that equable balance essential to Classic poise, and that, too, without involving any inconsistency with the interior arrangement. The main mass of the structure, on both the north and south fronts, exhibits symmetrical elevations of convincing dignity and, at the same time, replete with varied incidents that divert the eye and sustain interest. The detached study to the

East Front and Pool, House at Purchase, N. Y.

Leigh French, Jr., Architect

west, with its connecting loggia and curtain wall, and the service wing to the east, though utterly different in point of composition, successfully preserve the balance of the total mass. That much variety of design can be compassed without disturbing the underlying basis of symmetry is exemplified.

Both outside and inside the house evidences an agreeable, logical and satisfying use of materials. The walls are built of brick and painted white; the mouldings of the parapet are of limestone; the slopes of the roofs are of gray slates; the flat deck on top of the roof is covered with lead-coated copper, and the gutters and parapet flashings are of lead. For the veranda, at the west end of the living room, the columns are of cast iron specially designed, and the balustrade above is of wrought iron. This veranda is paved with bluestone flagging, and bluestone flagging is likewise used for paving the loggia connecting the study with the house, for the broad terrace along the south front, and for the copings of all the brick forecourt and garden walls. Inside, the floors of the stair hall and of the hall between the living room and dining room are of black terrazzo divided into squares by narrow brass bands. The stair balustrade is of wrought iron painted white, with polished brass handrail. In the library, which is completely paneled in pine, the floor is of teak. The floors of both the living room and dining room are of French walnut, laid with small rectangular units in the interlocking chequered pattern used with such admirable effect in the parqueted floors of seventeenth and eighteenth century France. Scraped,

Bay Window in Bachelors' House

Fireplace in Bachelors' House, House at Purchase, N. Y.
Leigh French, Jr., Architect

waxed and highly polished, these floors add immeasurably to the dignity of the two rooms in which they appear. The two-leaved doors of the living room and dining room are of heavy carved mahogany.

The materials used and the manner of their employment invite comment not only because they do not ordinarily occur as found here, but also because they go far toward giving that emphasis of stable structure which is so conspicuously present. Visible staunchness of construction, indeed, along with ample proportions, is one of the cardinal characteristics of the house; in this respect it is distinctly reminiscent of the best eighteenth century British manner of building. One feels instinctively that every item is carried out solidly to last and to be the same a hundred years hence as it is today, and close inspection does not belie the appearance; there is none of that thinness, none of that "pasteboardy" aspect, too commonly found in much modern construction, whose first pleasant effect, after close scrutiny, yields to the conviction that it is really little better than so much clever stage setting that cannot stand the test of time, pleasing but temporary.

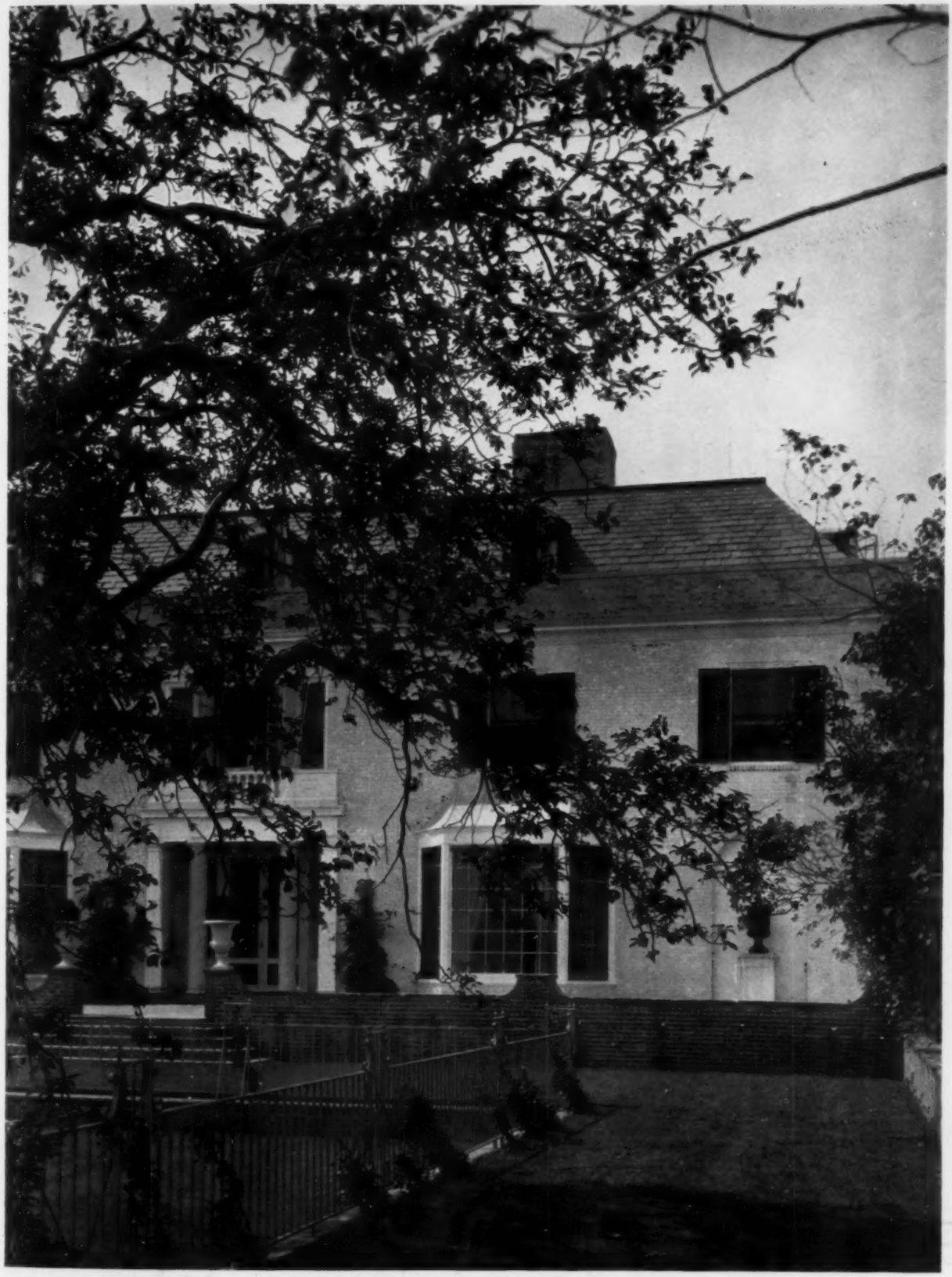
All the details, both out of doors and inside, are exceptionally well considered and will bear critical examination. The outer doorway on the forecourt and the inner entrance, within the loggia, prove a trustworthy foretaste of what follows. One of the happiest exterior incidents is the veranda at the south end of the living room; like the bay windows on the east terrace, it is one of those engaging Regency touches that characterize the whole composition. In this same category are the round-arched sinkages on the east front, graced by old lead vases on pedestals; likewise, the sinkages on the west front facing upon the forecourt. Echoing them is the arcading of the loggia that connects the little detached study and bounds the croquet lawn west and north. The interior detail in no wise falls short of the promise of the exterior. On entering the circular hall, instinct with the reticent grace of the Regency manner, the design of the wrought iron balustrade, the beauty of the plasterwork and the fashion of the lantern and wall brackets attest a scheme thoughtfully studied in every particular. The doorways and doors from the living room and dining room into the hall, the mantel in the living room, the carved baseboards and chair rails in the living room and dining room, and the niches in the dining room likewise merit special mention as evidences of the same attention to exquisite detail. Use of the water-leaf moulding of the dining room baseboard is an exceptionally pleasant departure from the customary treatment of such features.

It should be noted that every particular of the decoration and furnishing was determined by the architect; the result, it may be added, is highly satisfactory and shows excellent judgment. The dining room exhibits an unusually pleasant color treatment. The walls are a pale pearl-lavender,—that elusive color so much favored in the Regency period,—and the woodwork is a subtle coral hue picked out in gold. The gilding on the coral ground is particularly effective on the compo figures on the antique mantel, on the sunburst carving in the heads of the niches, and on the muntins of the window. The curtains are of green figured damask, made and hung in a characteristic Regency manner. In the hall the walls are a light sea green, another favorite Regency color, with the niche on the stairway and the reveals of the arches in white. The walls of the living room are a rich apricot, with the dado a deeper tone of the same color. Here the curtains are of light green glazed chintz with a flowered figure. The coloring in the rest of the house is carried out in the same interesting manner, making for a unified effect.

One of the most fascinating features of the house is the little detached study with a bedroom above it. The floor is paved with brick, soaked in oil and waxed, and the walls are paneled with vertical pine boarding, with moulded edges, from floor to ceiling. At one side of the ample fireplace, a stair concealed in the thickness of the wall ascends to the bedroom and completely appointed bath above; at the other side of the fireplace, there is a fully equipped kitchenette, with a refrigerator, likewise accommodated in the thickness of the wall and closed in by doors in the paneling so that it is entirely out of sight when the doors are closed. The bedroom above is also lined with vertical boarding from floor to ceiling and painted green-blue picked out with vermilion; the bed is built into the wall, in the manner of the old Norman beds, still common in some parts of France, the width of the bed corresponding with the width of the bathroom, so that the floor space of the bedroom is an unbroken rectangle in shape.

The swimming pool, to the east of the main body of the house, is of graduated depths. While perfectly calculated for the diversion of swimming, it has been so treated that it also serves the landscape purpose of a water garden, giving that charm to the ensemble that only water with its ripples can give.

As to the matter of architectural style, while the tone of the detached study is largely French, and while the interior of the library and other incidents here and there suggest a reversion to an earlier fashion, the treatment in the main is a very convincing exposition of the Regency manner. Without slavish and pedantic adherence to precedent, the architect has used a reasonable liberty of interpretation in combining *motifs* so that the total result manifests harmonious vitality as well as vigor of conception. Furthermore, without any obvious or actual striving for effect, the house has a refreshing dramatic quality quite in contrast with the air of desiccated propriety too commonly and wrongly associated with composition in the Classic manner. To this inherent dramatic quality, which is altogether logical and commendable, is due not a little of the compelling interest attaching to what is unquestionably one of the outstanding and most important examples of current domestic architecture.

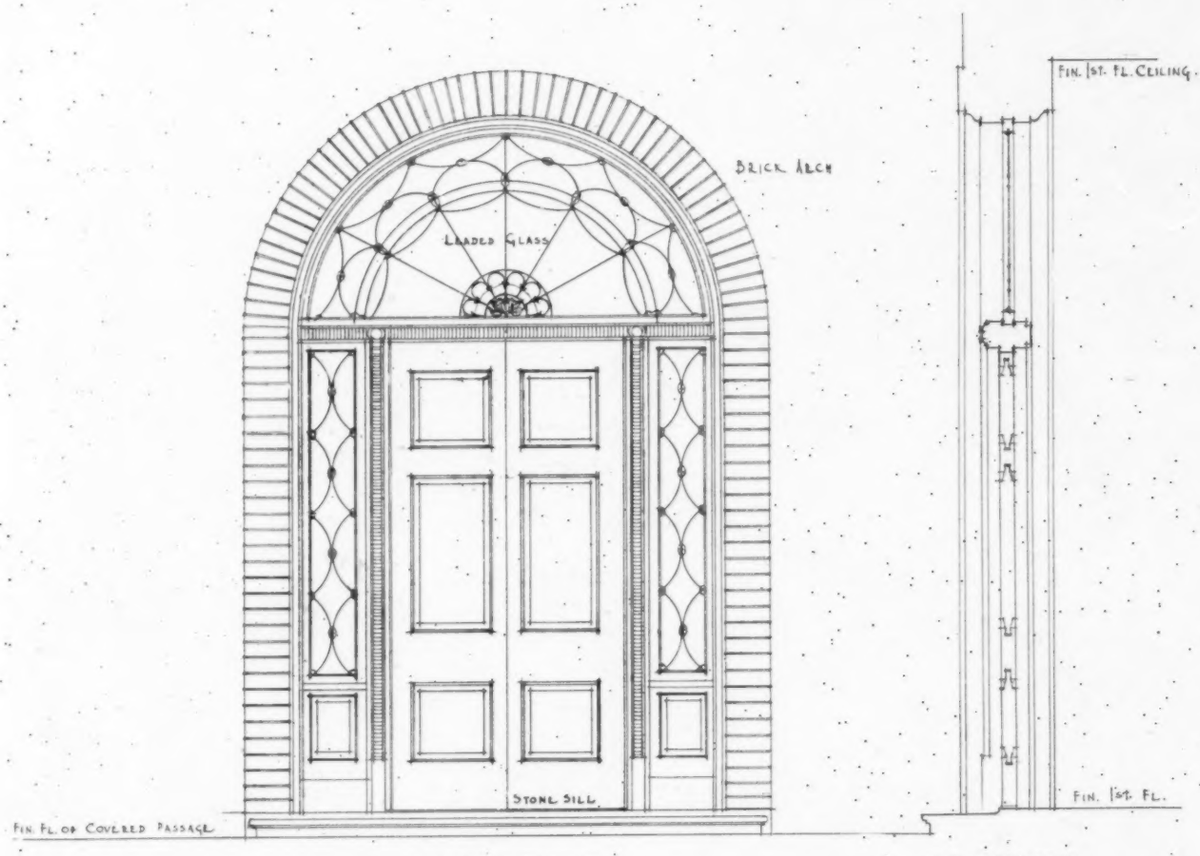


DETAIL OF EAST OR GARDEN FACADE
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT

DETAIL OF GARDEN TERRACE
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT

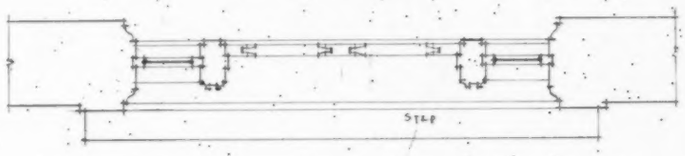
Detail of Main Door on Back

DETAIL, ENTRANCE FROM FORECOURT
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT



ELEVATION

SECTION



PLAN

DETAIL OF FRONT DOOR

SCALE

0 1 2 3 FT.

JAN. 1928

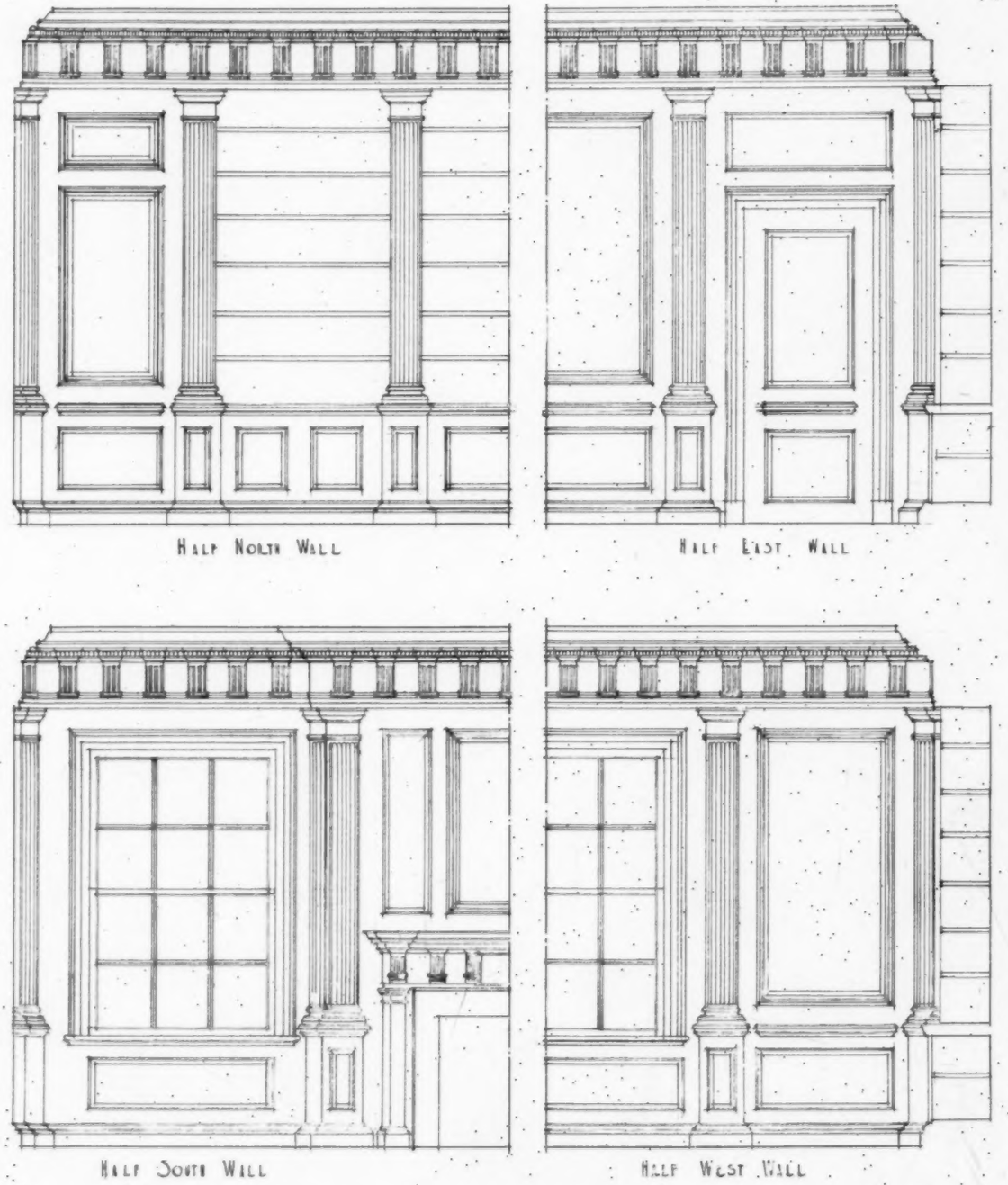
(THIS DOOR IS ILLUSTRATED ON PAGE 46)

No. 48

DETAIL OF SOUTH PORCH
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT

Detail on Back

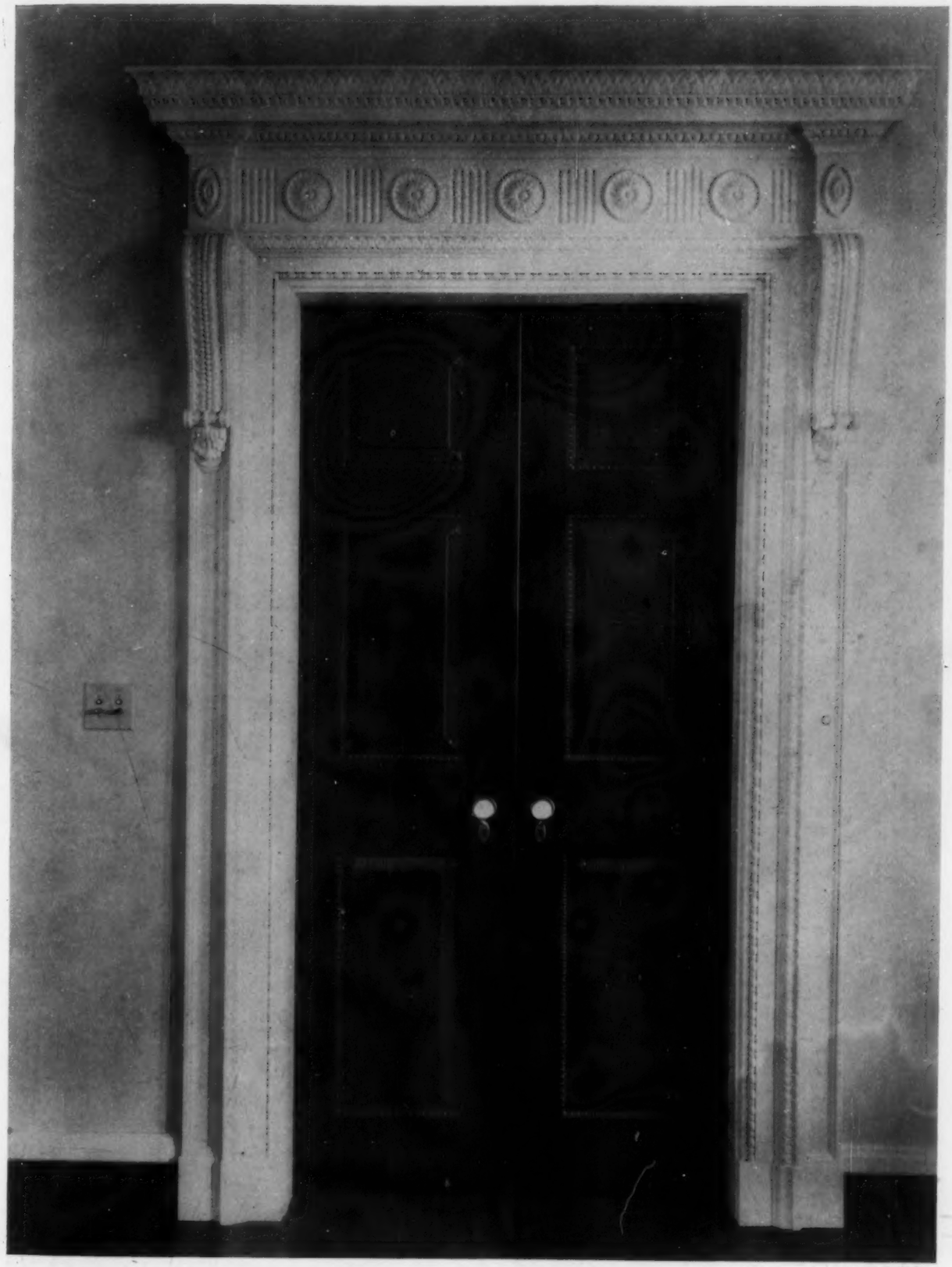
CORNER IN LIBRARY
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT



JAN. 1928

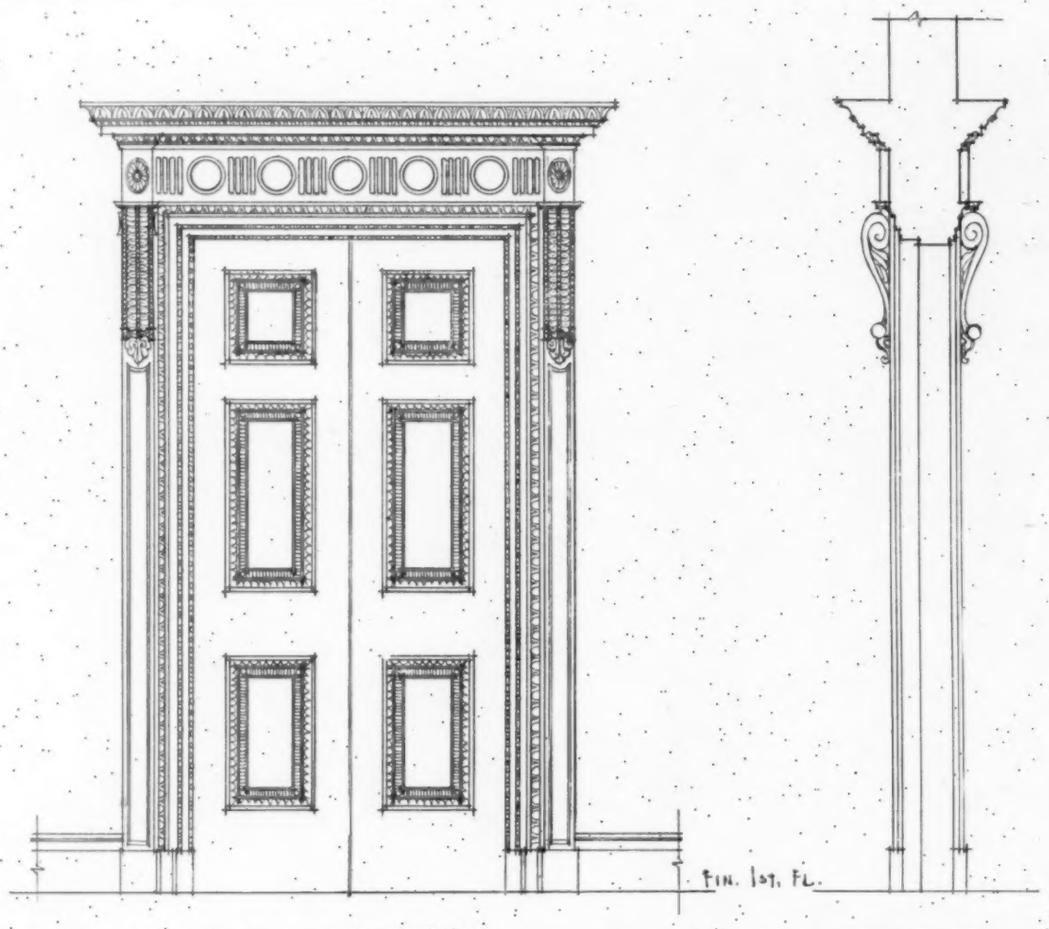
No. 49

The Architectural Forum Details



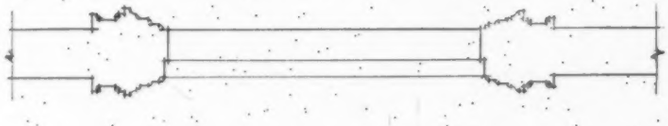
Detail on Back

DOOR INTO DINING ROOM
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT



ELEVATION

SECTION



PLAN

DETAIL OF DOOR

FOR LIVING ROOM AND DINING ROOM

SCALE

0 1 2 3 FT.

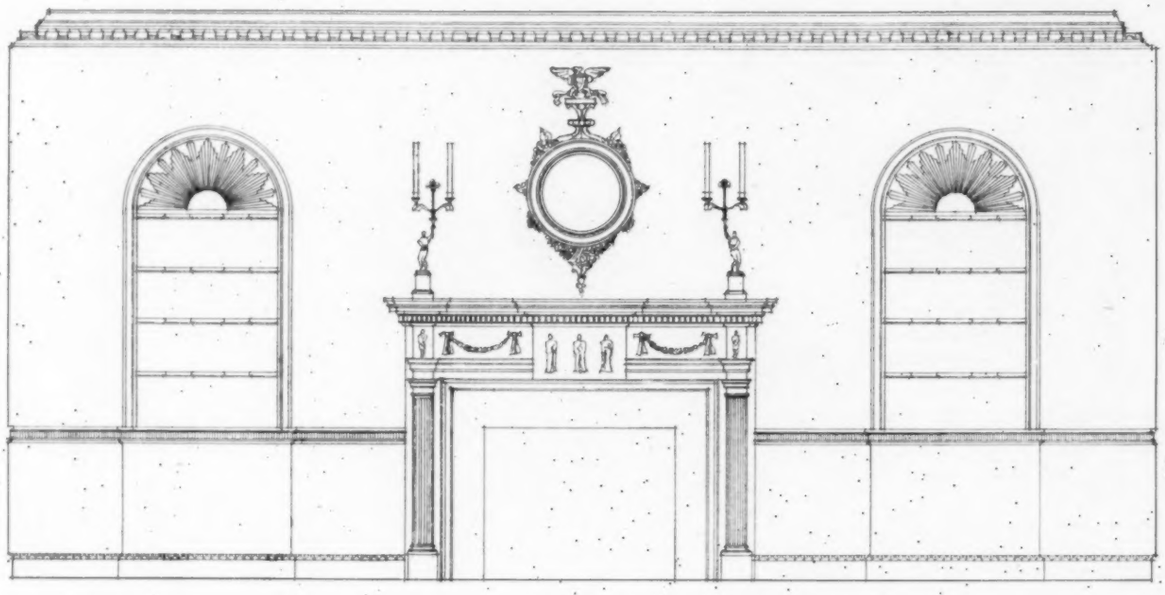
JAN. 1928

No. 50

WEST WALL OF DINING ROOM

FIREPLACE IN LIVING ROOM
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT

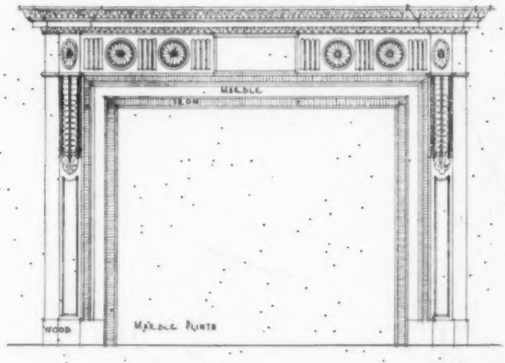
Details on Back



ELEVATION

WEST WALL
OF
DINING ROOM

LIVING ROOM
MANTLE



JAN. 1928

No. 51

The ARCHITECTURAL FORUM DETAILS

ARCHWAY IN EAST HALL

LIVING ROOM
HOUSE AT PURCHASE, N. Y.
LEIGH FRENCH, JR., ARCHITECT

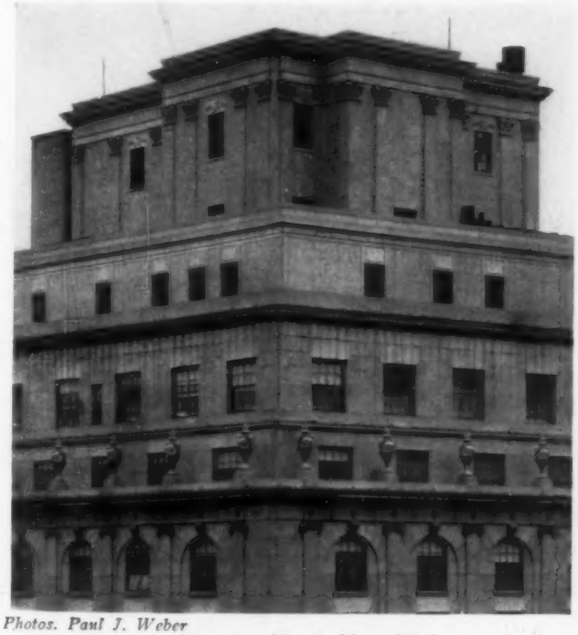
PAVILIONS IN THE AIR

ZONING laws are not alone responsible for the interesting and original character developed in the architecture of New York during the past ten years. The desire and necessity of concealing roof tanks and the tops of elevator shafts have led to a variety of successful solutions of this problem. These illustrations are from photographs of the architectural towers and roof structures on some of the recently completed commercial and hotel buildings in New York. This interesting group of "pavilions in the air" tell their own story and require no explanation. Few of the hurrying throngs down in the canyon-like streets ever have time or interest to look up in the air to discover these often well designed architectural screens which conceal important parts of the mechanical and plumbing equipment of tall buildings. It is hoped that this group of illustrations may have suggestion and inspirational value.

Photos. Wurts Bros.

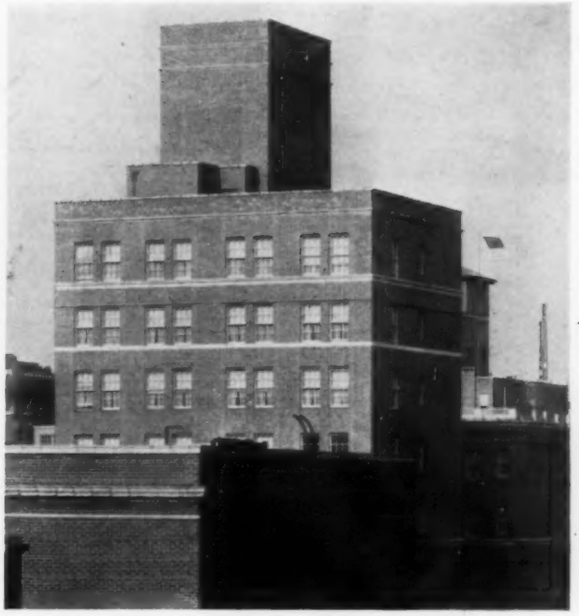
Aeolian Building, New York
Warren & Wetmore, Architects

Building at 8th Avenue and 36th Street, New York
George & Edward Blum, Architects



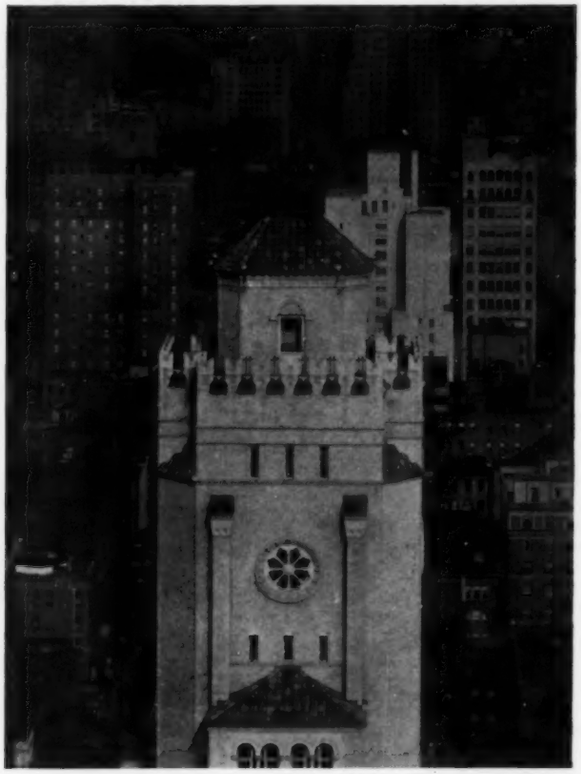
Photos. Paul J. Weber

Ambassador Hotel, New York
Warren & Wetmore, Architects

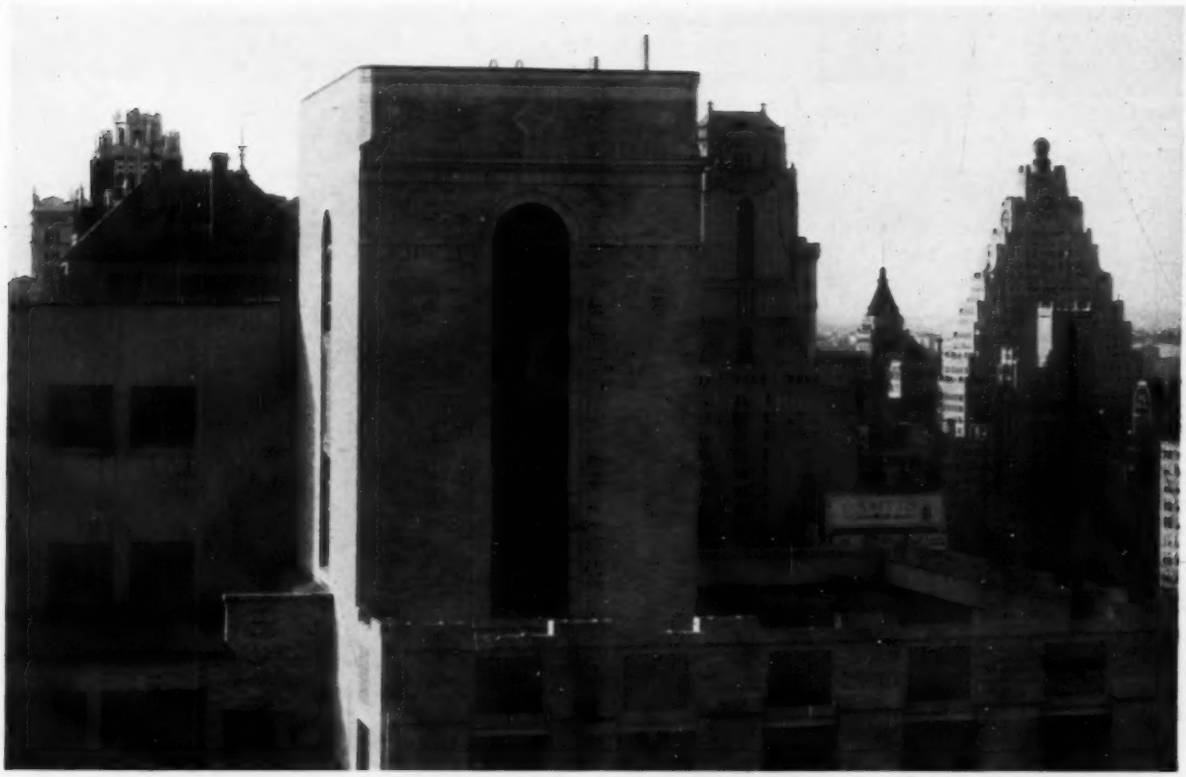


Hotel New Weston
Robert J. Lyons, Architect

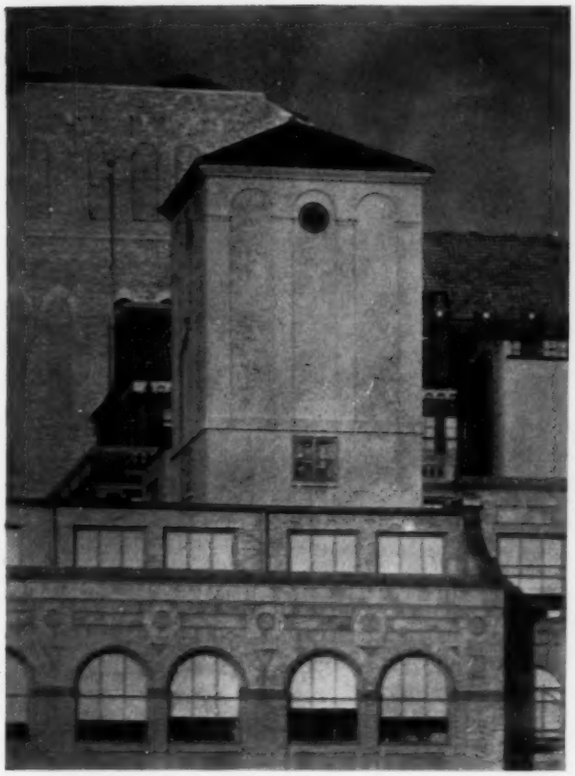
PARK LANE HOTEL (in Foreground)
SCHULTZE & WEAVER, ARCHITECTS



HOTEL BEVERLY, NEW YORK
EMERY ROTH & SYLVAN BIEN, ARCHITECTS

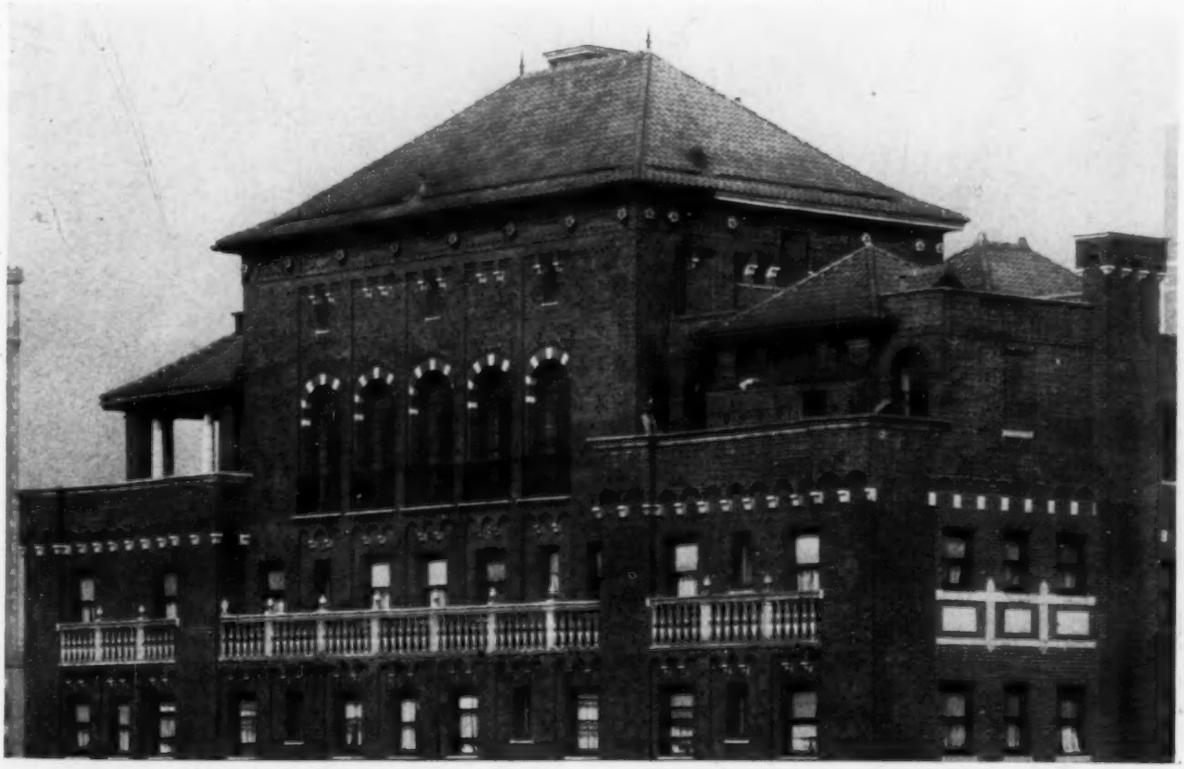


BUILDING AT 274 MADISON AVENUE, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS

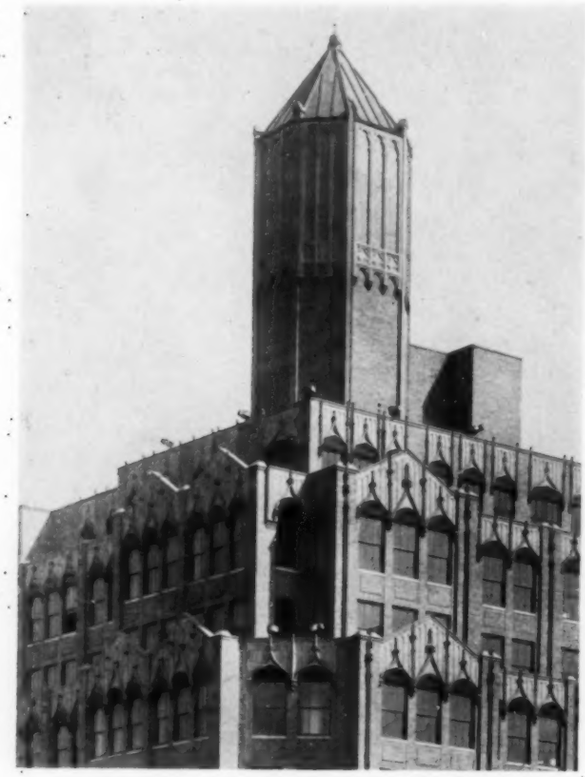


EAGLE BUILDING, NEW YORK
ROUSE & GOLDSTONE, ARCHITECTS

BUILDING AT 277 PARK AVENUE
McKIM, MEAD & WHITE, ARCHITECTS



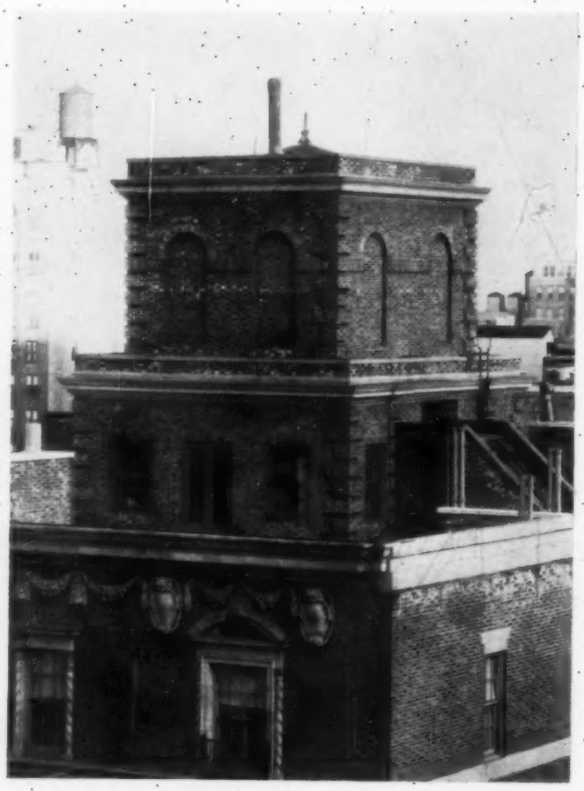
ALLERTON HOUSE, MADISON AVENUE AT 55TH STREET
ARTHUR LOOMIS HARMON, ARCHITECT



BUILDING AT 245 FIFTH AVENUE
GEORGE FRED PELHAM, ARCHITECT

HOTEL ELYSEE, NEW YORK
HARRY ALLAN JACOBS, ARCHITECT

HOUSE OF MRS. WHITELAW REID, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS



HOUSE AT 22 EAST 36TH STREET, NEW YORK
LOUIS E. JALLADE, ARCHITECT

ARCHITECTURAL AVOCATIONS

THE DIGRESSIONISTS

BY

ONE OF THE LEAST OF THESE

"Da Vinci is our patron saint;
He spent his life digressing.
He knew damn well the way to paint,
And kept his critics guessing."

THUS in song do the Digressionists acknowledge the leadership of Leonardo, for was he not preëminently a Digressor? Learned in higher mathematics, skilled in engineering, wielding a mean mallet in sculpture and a meaner pen in his scientific literature, his fame finally rests on what he achieved in painting. Michelangelo also was so versatile that it is difficult to decide which art was his vocation and what art his digression. We who modestly follow in the footsteps of these giants frequently trip on the imprints they made in the sands of time. We are immensely attracted by the idea of not forever traveling on a single-track road, and we welcome the thought of a branch line which will permit us to enjoy participation in what the world offers in the allied arts, arts which are many and varied.

The Digressionists' Medal
The Flying Fish Symbolizes One Digressing from One's Natural Element

The Digressionists are a group of 25 busy architects who have learned the art of employing what little spare time they have in excursions into other fields of artistic endeavor. As indicated by their symbol of the flying fish, they are out of their element, but unlike that mysterious little creature, they do not remain submerged most of the time. Many of them are well known members of the architectural profession. A Digressionist is free to paint, model, etch, draw, photograph or express himself in any of the graphic arts, so long as he does not become too architectural. The unwritten law of the society requires that a Digressor who most fully qualifies for that title be one who takes up a new field in art, something for which he has not necessarily been trained but for which he shows a natural aptitude. He is not forbidden to exhibit sketches of architectural subjects, but by common consent such efforts are not real digressions even when they are superlatively well done. Many an architect learns how to make a fetching little water color before he is capable of drawing a full-sized detail of a window box. In consequence of the almost universal love of water color rendering among the members of this little society, it is not surprising that a large portion of the material submitted for exhibition is of landscapes or seascapes in that most adaptable medium.

In 1908 J. Monroe Hewlett remarked in the presence of Charles Ewing that inasmuch as a good deal of collaborative work was being done by architect, painter, and sculptor, it might be a good thing for all concerned if the architect, who usually has the controlling voice in this collaboration, were to try his hand at painting and sculpture. It was believed that in no other way could he so well understand the difficulties which usually beset the painter and the sculptor when they are engaged to embellish buildings. It was a big idea, prompted by a desire to be fair to the collaborating artists, who are not often given satisfactory surfaces for mural decorations or adequate spots for sculptural adornment. Messrs. Hewlett and Ewing learned that a similar idea was hatching in the mind of Grosvenor Atterbury, so a conference of the three was called and "The Digressionists" sprang into being. Today, "digressing" includes craftsmanship, poetry and prose writing, musical composing, piano and violin playing, singing, etc. The field is wide open to include any form of expression which is not the architect's vocation.

In the years which have elapsed since the founding in 1908, 38 names have been enrolled on the roster. Of these, five, or about 14 per cent, are no longer living. These are Austin Lord, Breck Trowbridge, Russell Hewlett, Cary Rodman and Bertram Goodhue. Of the remaining 33, William A. Boring and Edward L. Tilton have resigned, to assume the title of *Digressor Emeritus*. John Benson was placed in this same rating because he forsook architecture and became a professional painter. William A. Taylor was induced to drop architecture for big business. Retirement to a distant city caused his name to be omitted from the rolls. Others who are no longer members are Welles Bosworth, Henry Hornbostel, Louis Metcalfe and Frank Holden. The present membership of 25 includes: The founders, Messrs. Hewlett, Ewing and Atterbury; Fred Ackerman, Chester Aldrich, William T. Aldrich, George Chappell, John Cross, William A. Delano, Howard Greenley, Wallace Harrison, Edward Howes, Fred

Hirons, H. V. B. Magonigle, Julian Peabody, Robert Potter, Hubert Ripley, John Tompkins, Alexander Trowbridge, Ernest Tyler, Arthur Ware, Lawrence White and Edgar Williams. Frank Crowninshield, in recognition of his very great interest in the society, evinced in many ways, has been made an honorary member. Such is the society's membership.

For a long time it has been the custom to have the digressions judged by a jury of non-members, selected chiefly from the ranks of professional artists and occasionally from among the architects. Practically every painter and sculptor of rank in New York has at one time or another served on this jury. The members of the jury are given to understand that they are expected to earn their dinners by holding a judgment in the exhibition room during the hour or two preceding the dinner. The bronze medal of the society is awarded to that digression in the graphic arts which, in the opinion of the jury, has the greatest distinction. Three or four honorable mentions are awarded to other exhibits which are second in merit to that receiving the medal. The medal has been awarded 21 times. J. M. Hewlett received it five times, Edward Howes four, Messrs. Taylor, Delano, Chester Aldrich and Chappell two each, and Russell Hewlett, Ewing, Benson and Peabody once. In this way honors have been awarded.

The official records of the society show that during the past 20 years there have been 58 jurymen, and that 20 per cent of these have died. Shall it be assumed from a comparison of this statement with the mortality of the Digressors, only 14 per cent of whom have died, that digressing prolongs life? Or shall we conclude that judging digressions is a hazardous occupation? Whatever the answer, the members will testify that there has been no influence in their lives more stimulating to their continued growth than this little annual gathering. At the dinner a chief Digressor is chosen to head the group at the next succeeding exhibition. It is his duty to send to all members a general reminder during the winter that on a certain day in April the year's digressions will be delivered at the Coffee House Club and that they are all expected to get busy and prepare something for the show. There are usually about 75 exhibits. As previously explained, the majority are water colors. These are sometimes of high quality, quite good enough for any water color show. Hewlett, Magonigle and Atterbury have frequently sent oil paintings. Howes and Greenley have etched. Ackerman has gone far in his researches in pictorial photography. Chester Aldrich and Breck Trowbridge divided the honors in sculpture. Delano, besides showing charming water colors, exhibited delightful dancing figures in black silhouette on large mirrors. Tyler has shown crayon portraits. White has sent in a series of *ex libris* designs at the scale required for library use. As this is written somewhat from memory, it is possible that a few types of digression in one form or another of the graphic arts have been omitted from this list.

Several years ago Frank Crowninshield, while serving as a juror, offered an annual prize in the form of a cup to stimulate digressions in fields outside of the graphic arts. This has proved to be a very popular innovation, bringing out craftsmanship, music, poetry, prose writing, etc. The first winner in this competition was the late Breck Trowbridge, who delighted everyone with his skill in fabricating a hunting bow with arrows and a collection of trout flies. He added to the interest aroused by this exhibit by telling of his experiences as a hunter with this archer's outfit. Bob Potter, an enthusiastic astronomer, was awarded the Crowninshield cup for poetry, written and declaimed. In '26 the cup was awarded to George Chappell for his wit and humor in the minutes read at the '26 dinner covering the dinner of the year before, and for his skill in reading them under difficult circumstances. In 1927 Chester Aldrich wrote the words and music of a song entitled "The Flying Fish," and Alexander Trowbridge sang the song to Aldrich's accompaniment. For this exhibit of collaboration in the arts both names were inscribed on the Crowninshield cup presented then.

To Breck Trowbridge
By J. Monroe Hewlett
April 29, 1925

Two years ago, around this festive board,
We listened to our Master Bowman tell
Tales of the fashioning of arrows straight,
Balanced and feathered, tipped and finished well.
And how to test the wood from which a bow,
Finer by far than ancient archer knew,
May still be formed by art and care and craft
To hold the course of arrows strong and true.
He told us of the wild swan's ghostly flight;—
And now he's gone to join that mystic quest.
In hunting grounds beyond the setting sun,
He learns the meaning of our "going west."

The Old Amateur
By R. Burnside Potter

What matters it that, weary and alone,
I sit and think of things I might have done?
What matters it that wife and children shun
In me a dreamer, a mere rolling stone?
What matters it that rustic neighbors fear
In me a madman, all because I know
The motions of the comets and the flow
Of time, that travels on from year to year?
What matters it? There are far better men
To count the days and seasons, as they run,
And weigh this planet that we dwell upon.
But yet, I feel it matters somewhat, when—
What matters it?—I see, across the wire,
The transit and the star of my desire!

One of the members is at present deeply engrossed in the mysteries of stained glass windows, and is learning how to paint and etch upon glass, how to

bake it, how to cut stained glass, and how to "lead" it in a window. He is not doing it solely for fun, but hopes to learn enough about this alluring craft to enable him to appreciate the difficulties and the beauties of the work executed by professional window makers. Another member has found pleasurable excitement in an excursion into lithographic drawing on stone and on transfer paper. He plans to exhibit some of this work next April. More might be divulged on the delightful programs, mostly impromptu in character, which are offered by the members after the dinner. Here songs by Chappell, Ware, Greenley and Trowbridge are interspersed between sonnets and poems by Potter and Hewlett. Magonigle is always urged to give his famous rendition of the mating calls of wild animals; Atterbury has several times played violin obbligatos to songs. It is probable that there are still to be uncovered certain talents among the more diffident members, and that in the next few years this list of legitimate and *ex-curricula* digressions will be somewhat augmented.

Professional artists who judge these digressions have said that the one thing which impressed them more than any other was that all this artistic work was done for the fun of the thing. The dollar sign is not present in any form. I am not aware that in the 20 years since this society was founded a painting has been offered for sale, though it may be that here and there when a Digressionist was hard up he may have tried the experiment of finding out whether the public agreed with the jury in voting merit to a painting! The contact between the members and the jurors has been well worth while, for the professional artist learns that the architect is a regular fellow after all, in spite of his apparent neglect in omitting from his buildings the surfaces upon which the painter and the sculptor seek immortality; thus both jurors and Digressors benefit.

A Digressionists' Jury Announcement

SMALL BUILDINGS

THE SECOND COMMON BRICK HOUSE COMPETITION

PRIZE WINNING AND HONORABLE MENTION DESIGNS

THE Second Common Brick House Competition sponsored by the Common Brick Manufacturers' Association of America was announced early in 1927 to close November 1. This was an unusually interesting type of dwelling competition, because it called for photographs and plans of houses and bungalows which have been actually constructed with exteriors of common brick. Most of the national architectural competitions which have been held in this country have called for sketch plans and elevations, but when actually completed houses are called for, as in this competition, it is obvious that architecture must pass the acid test of reality.

The requirements of the competition included no limitation as to the sizes of houses nor to the construction of exterior walls, except that the surface of the exterior walls was required to be at least 75 per cent common brick under this definition: "Common brick, as defined by the Common Brick Manufacturers' Association of America and for the purpose of this competition, is a solid building unit of burned clay having a natural surface not treated to produce special effects in color or texture of the individual brick, but including clinker, overburned, and cull brick." These varieties of brick are easily had.

Each entry in this competition consisted of three photographs, including a full perspective view of the house, an architectural detail, and a close-up photograph of a portion of the exterior wall which would clearly show the details of the brickwork, such as its texture, pattern, bond, etc. Plans included the cellar and floor plans, drawn to ⅛-inch scale.

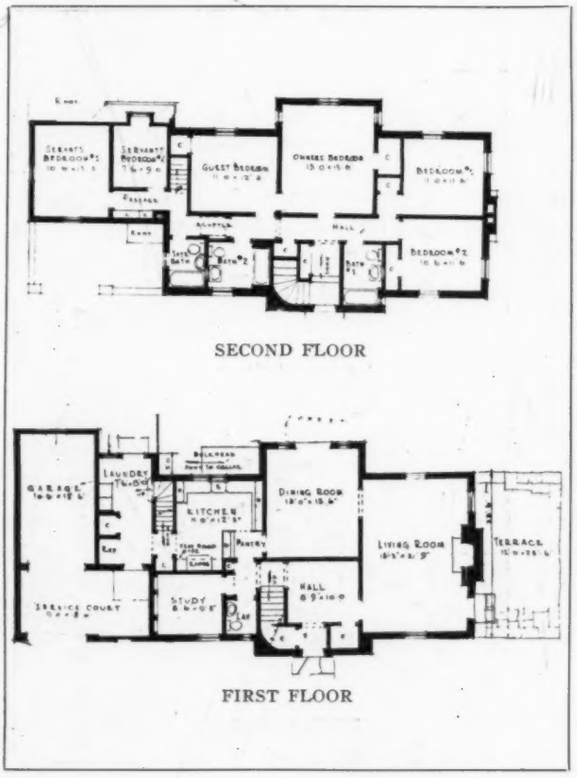
The competition announcement stated that "the jury will consist of three architects of national reputation in residential design. The jury will meet within one week after the termination of the competition, and competitors who win prizes or honorable mention will be notified the day after the jury completes its awards. The judgment will be based on architectural design, efficient planning, and ingenuity displayed in the development of attractive exteriors of common brick. All competitors will be notified as to the results of this competition within one week after the jury has completed judgment."

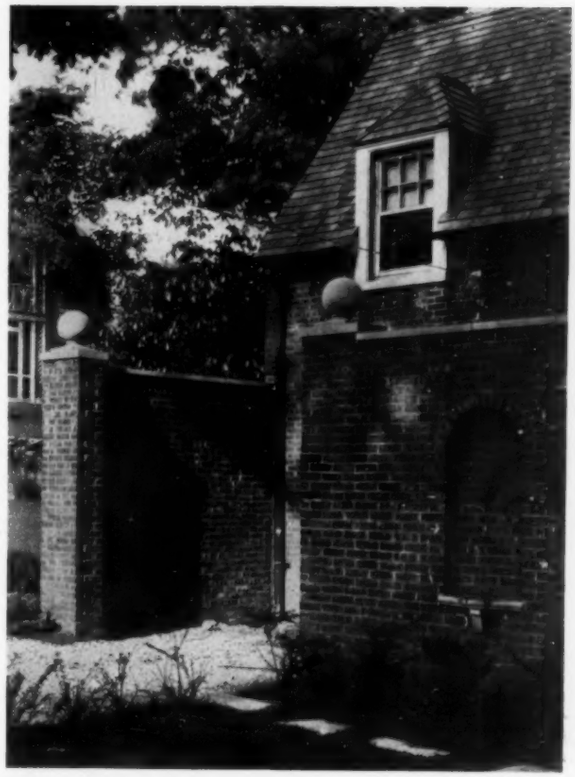
The jury, consisting of C. Stanley Taylor of New York, Alexander Donaldson of Detroit, and Frank B. Meade of Cleveland, met on November 2 to complete the judgment. Twenty-four awards were made: First prize, James C. Mackenzie, Jr., New York; Second prize, R. C. Hunter & Bro., New York; Third prize, Frederick Kennedy, Jr., Pasadena; Fourth prize, Bohnard & Parsson, Cleveland. Honorable mentions were awarded in this order: A. C. Runzler, Milwaukee; Burns & James, Indianapolis; Eldridge T. Spencer, Berkeley, Calif.; Alfred Easton Poor, New York; Arthur L. Loveless, Seattle; La Beaume & Klein, St. Louis; Robert Maurice Trimble, Pittsburgh; La Croix & Memmler, Milwaukee; La Beaume & Klein, St. Louis; William Addison McElory, Houston; and special mentions were awarded to Flint & Broad, Dallas; Owen James Southwell, Atlanta; Lester J. A. Julianelle, New Haven; Hans Gehrke, Detroit; Smith & Walker, Boston; H. Raymond Heckman, Reading, Pa.; Donald W. Southgate, Nashville; Eisenberg & Feer, Boston; Robert O. Derrick, Detroit; William T. Braun, Chicago.

On other pages there will be found the prize-winning houses, the ten honorable mention houses, and two of the special mention houses. In commenting on the entries in this competition, it was the opinion of the jury that they had never seen in any residential competition so many consistently good designs. Of the group of over 150 entries there were very few which could be discarded at first glance, with the result that the rendering of judgment was extremely difficult, and the balance in favor of one house as against another was often extremely delicate. The designs were of an unusual quality.

It is to be remembered, in considering the winning designs, that the specific terms of the competition established the basis of judgment in three parts,—(1) architectural merit without respect to landscaping; (2) efficient planning; and (3) ingenuity displayed in the development of attractive exteriors of common brick. With these three factors in mind, the jury examined each entry with extreme care. The plans of the various prize-winning houses were analyzed from all practical points of view, including that of economy of construction. Careful consideration was given to the provision for natural lighting and ventilation, ease of circulation, and general efficiency for domestic administration. The architecture in all cases was called upon to pass the test of conservative good taste, and little consideration was given to what might be termed "freakish" designs. It was felt that as the results of this competition would be generally broadcast to the public, every effort should be made to admit only good precedent.

The jury was greatly interested in the broad range of brick effects, which included many ingenious combinations of patterns, bonds and textures. The houses illustrated herewith indicate clearly the possibilities of carefully studied common brick exteriors, using not only the more conservative textures but also such varieties as "skintled" brick, along with extruded mortar joints, painting of the brickwork, and a number of combinations of forms and colors.

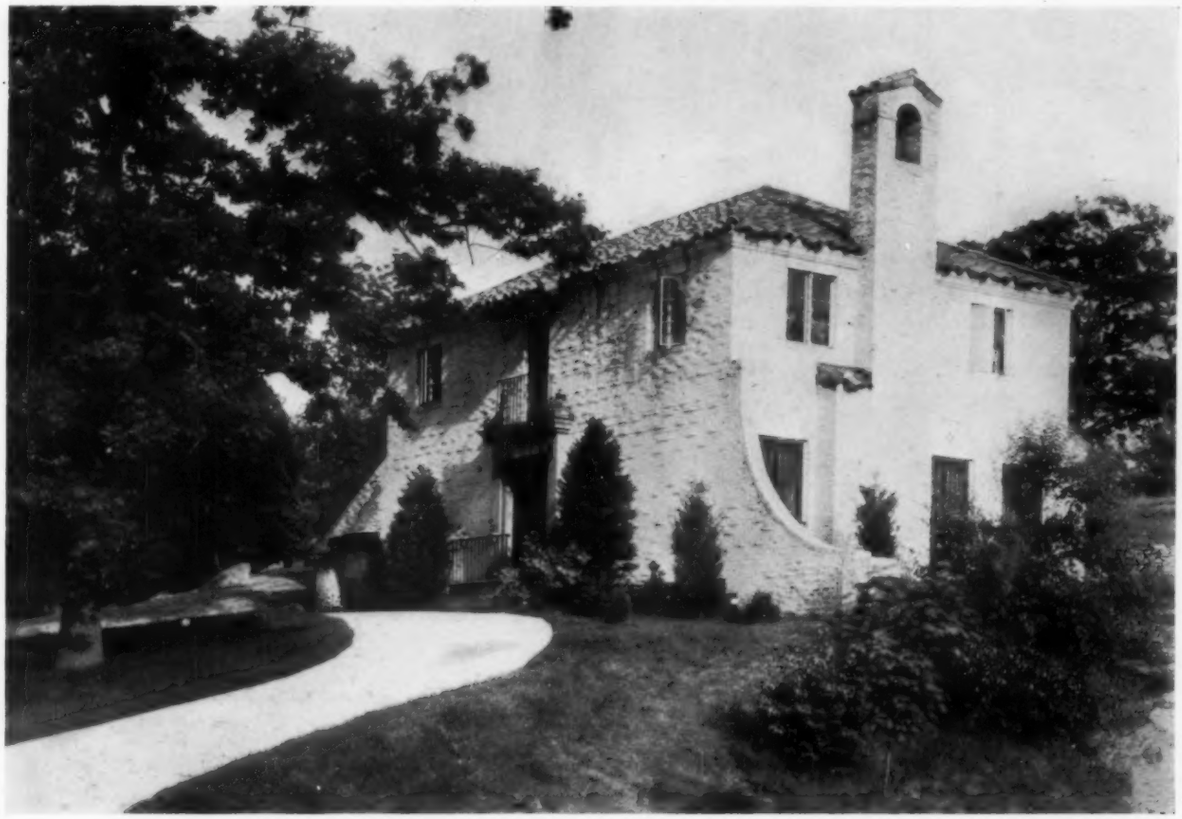


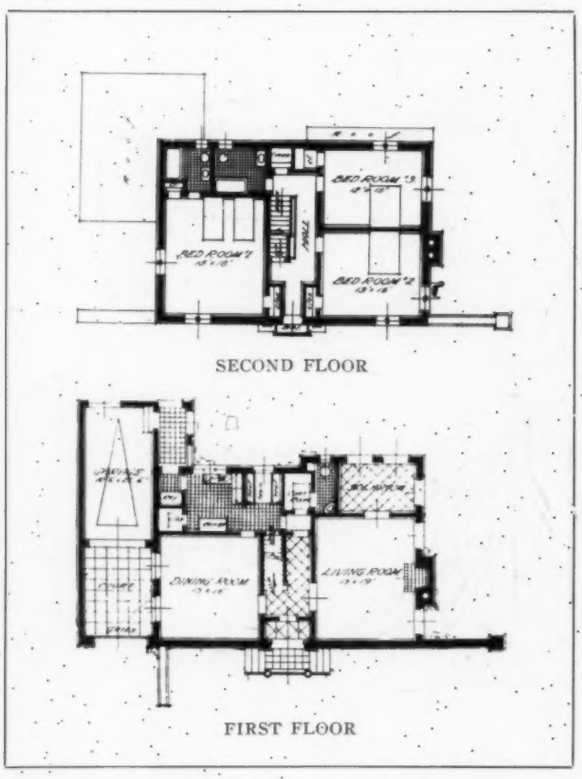


FIRST PRIZE

SECOND COMMON BRICK HOUSE COMPETITION

JAMES C. MACKENZIE, JR., ARCHITECT, NEW YORK

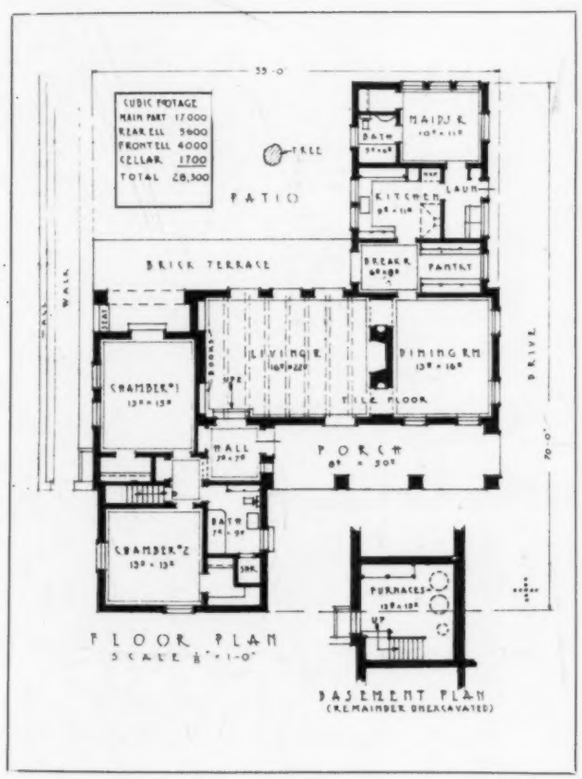


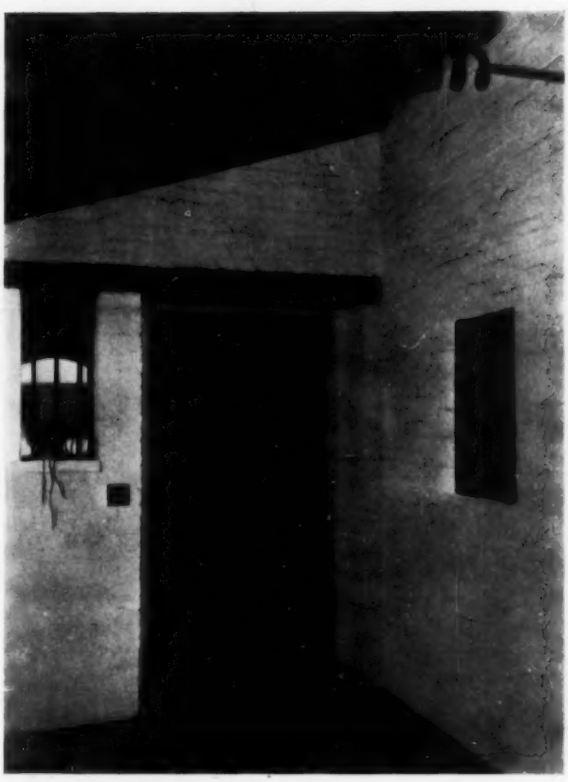


SECOND PRIZE

SECOND COMMON BRICK HOUSE COMPETITION

R. C. HUNTER & BRO., ARCHITECTS, NEW YORK

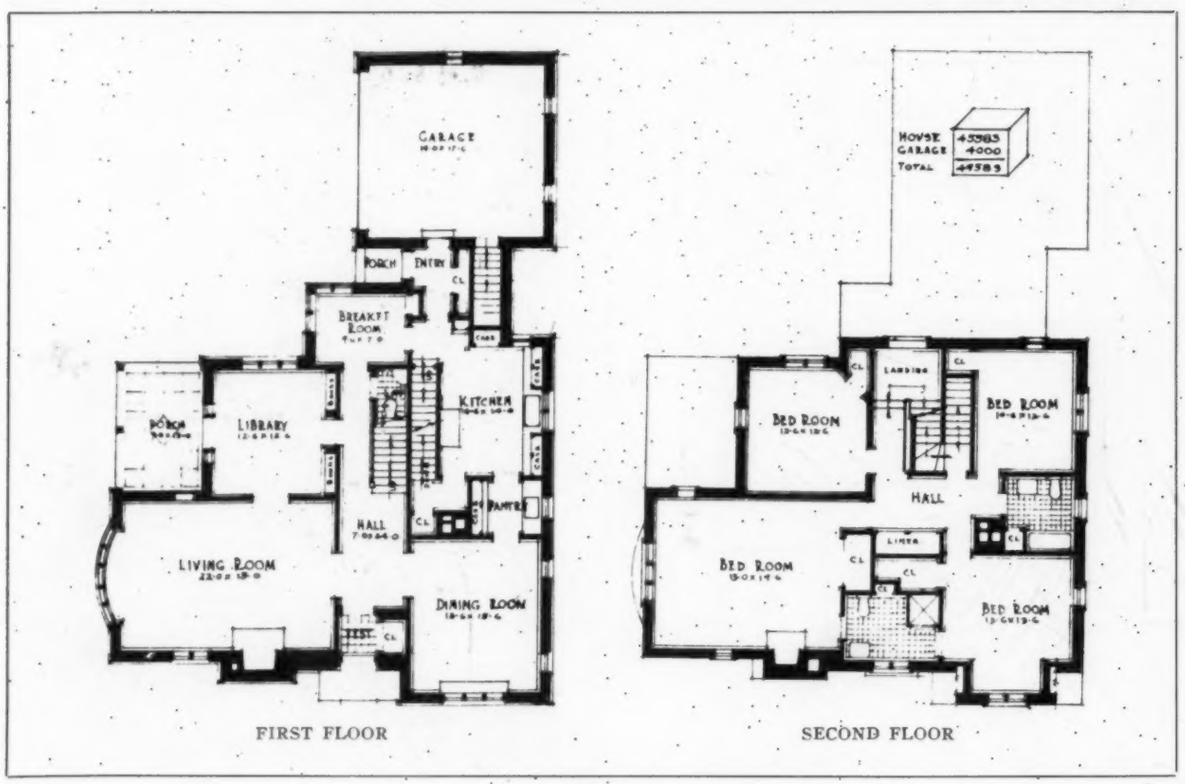




THIRD PRIZE

SECOND COMMON BRICK HOUSE COMPETITION

FREDERICK KENNEDY, JR., ARCHITECT, PASADENA

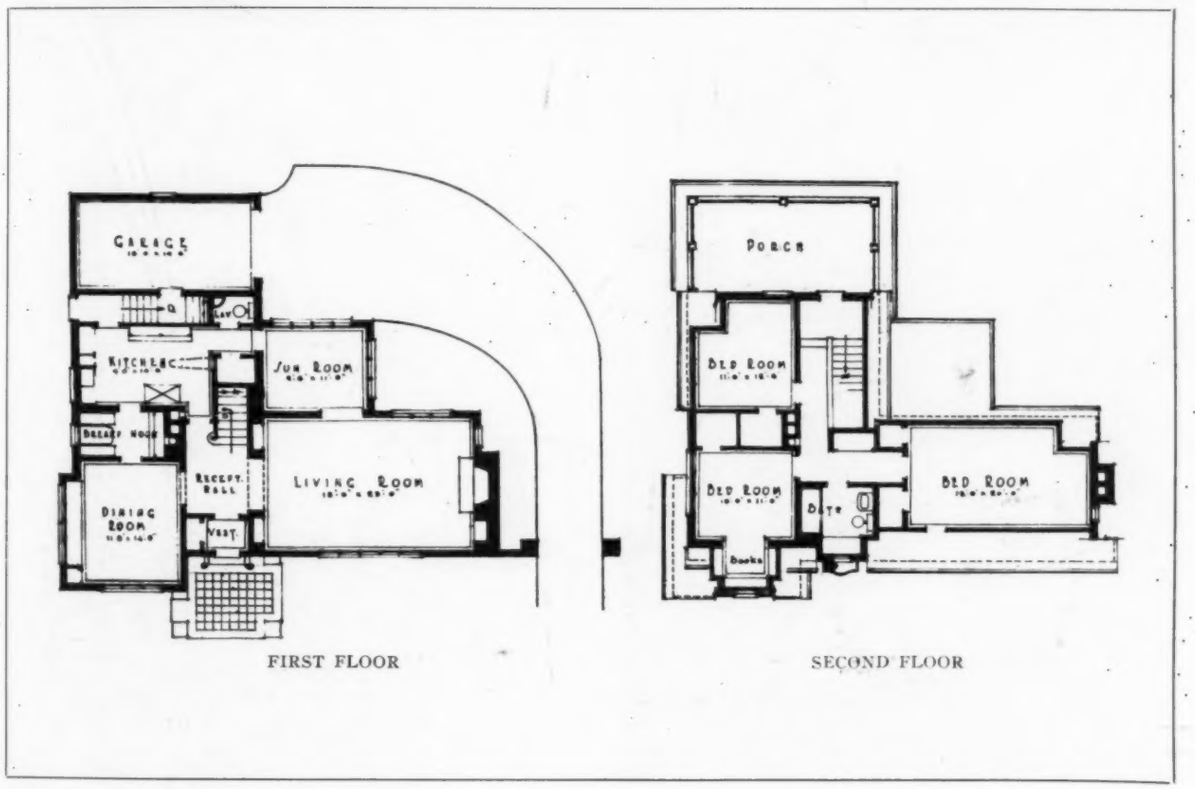


FIRST FLOOR SECOND FLOOR

FOURTH PRIZE

SECOND COMMON BRICK HOUSE COMPETITION

BOHNARD & PARSSON, ARCHITECTS, CLEVELAND

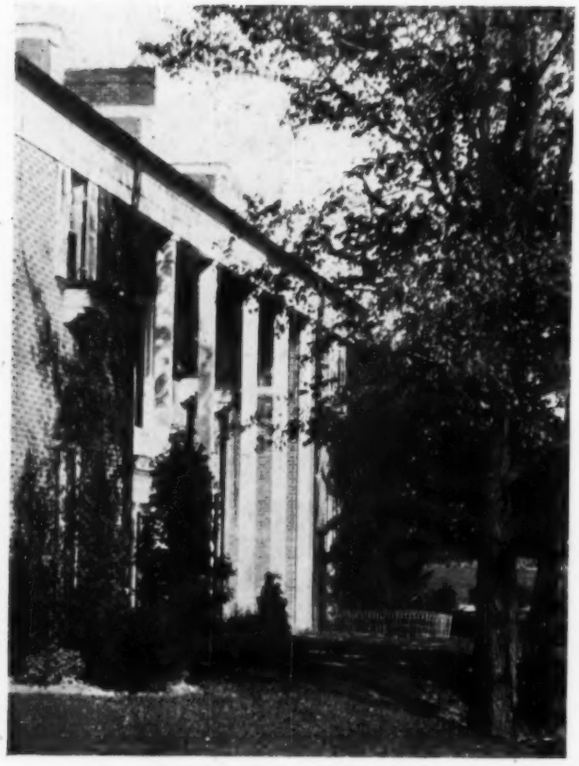


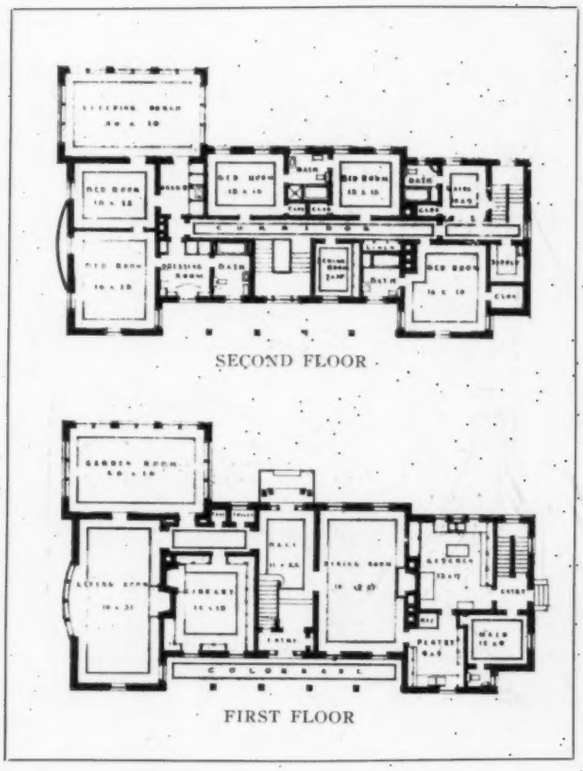
FIRST FLOOR SECOND FLOOR

FIRST MENTION

SECOND COMMON BRICK HOUSE COMPETITION

A. C. RUNZLER, ARCHITECT, MILWAUKEE

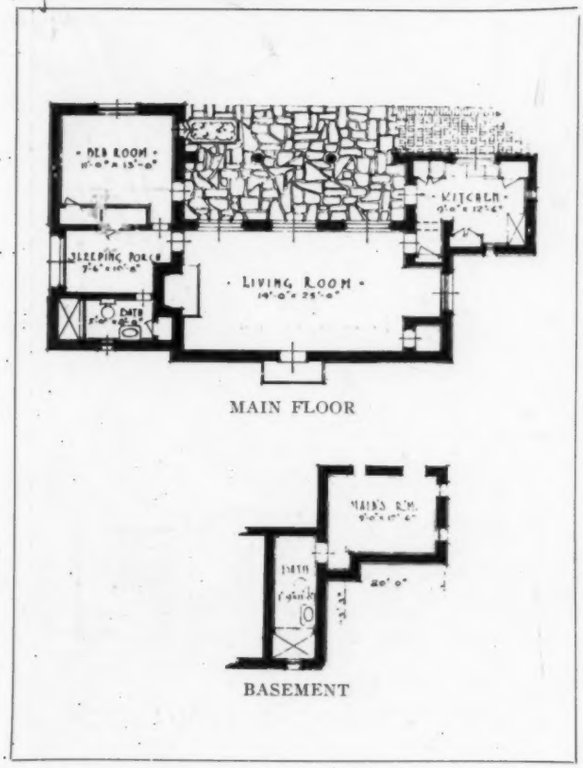




SECOND MENTION

SECOND COMMON BRICK HOUSE COMPETITION

BURNS & JAMES, ARCHITECTS, INDIANAPOLIS



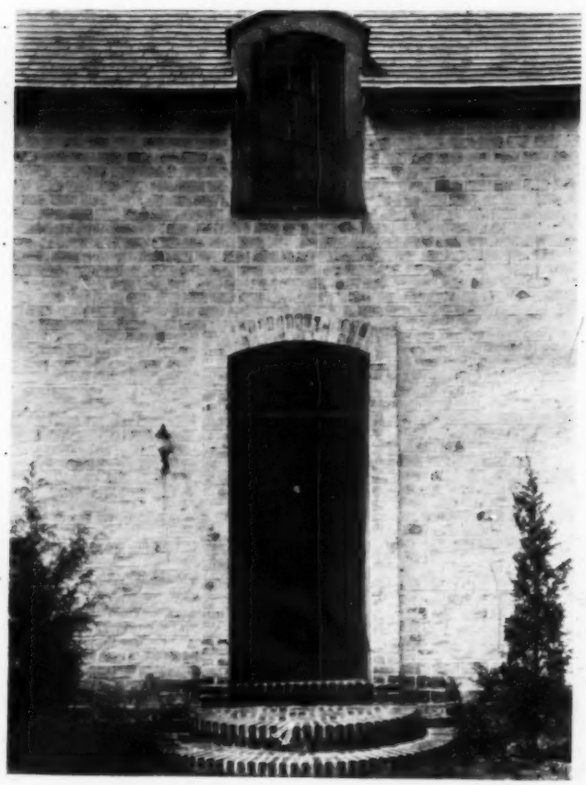
MAIN FLOOR

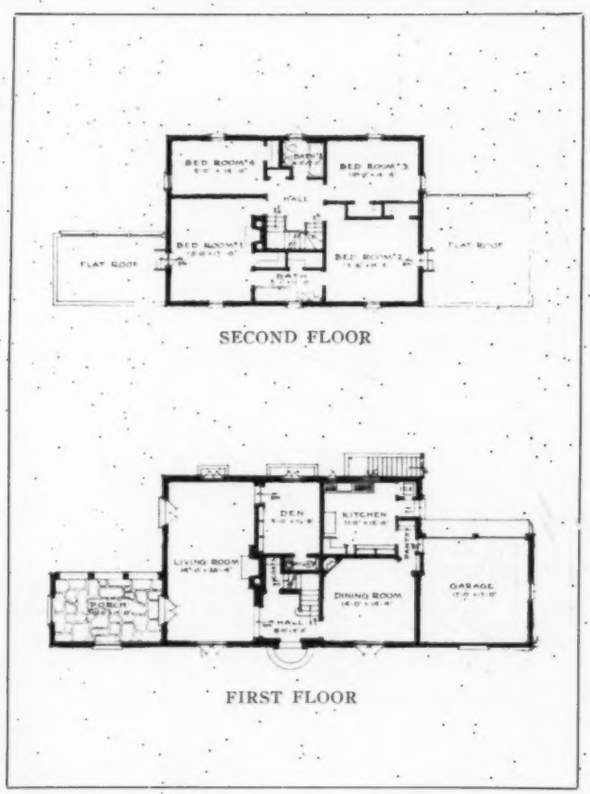
BASEMENT

THIRD MENTION

SECOND COMMON BRICK HOUSE COMPETITION

ELDRIDGE T. SPENCER, ARCHITECT, BERKELEY, CAL.

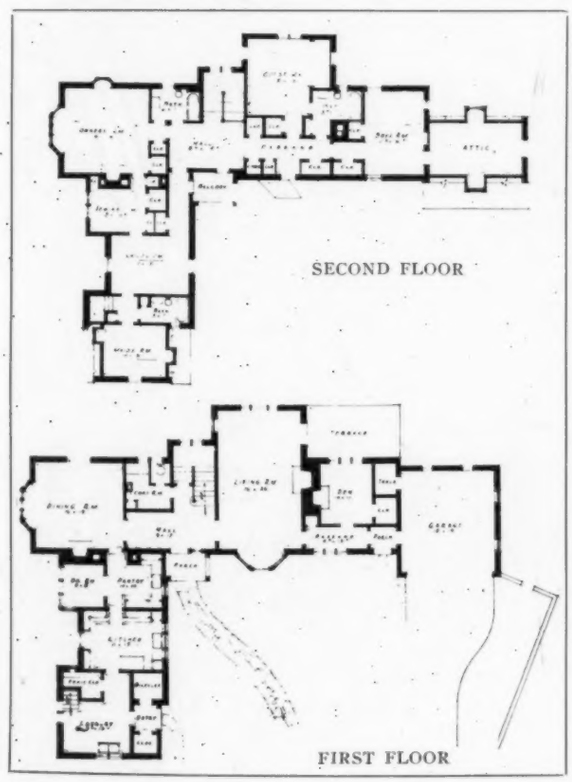




FOURTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

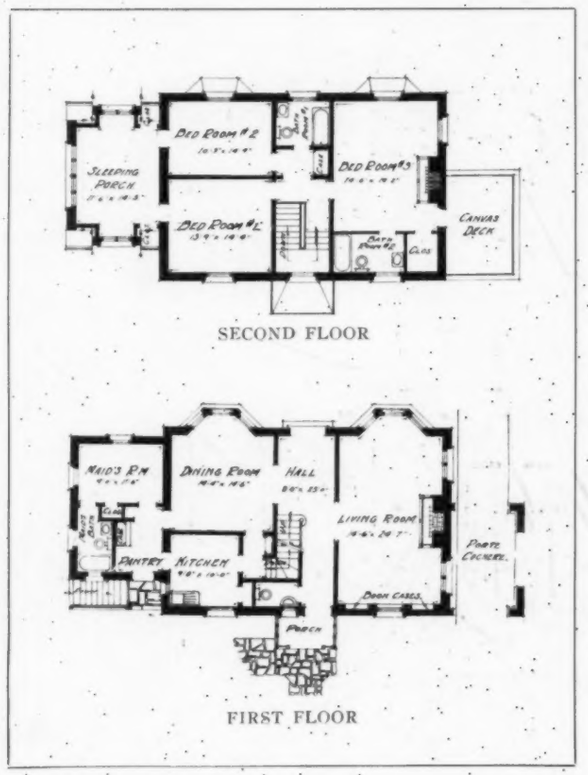
ALFRED EASTON POOR, ARCHITECT, NEW YORK



FIFTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

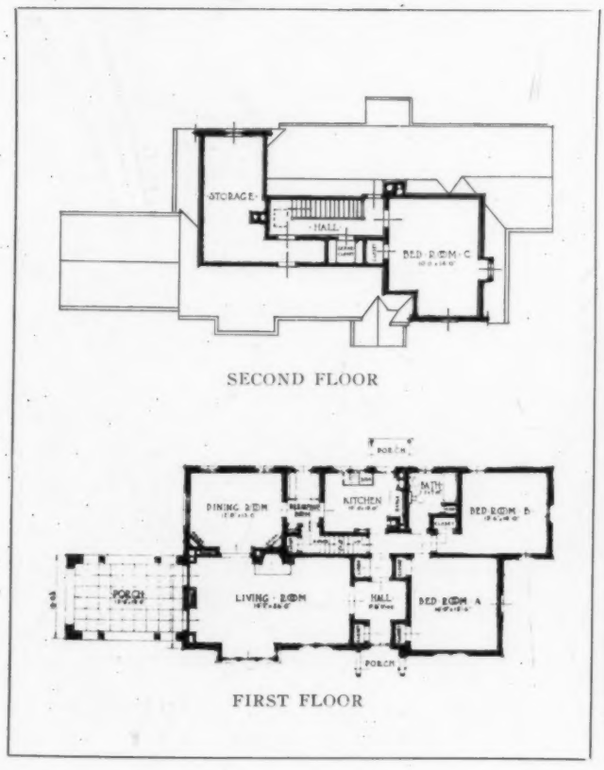
ARTHUR L. LOVELESS, ARCHITECT, SEATTLE



SIXTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

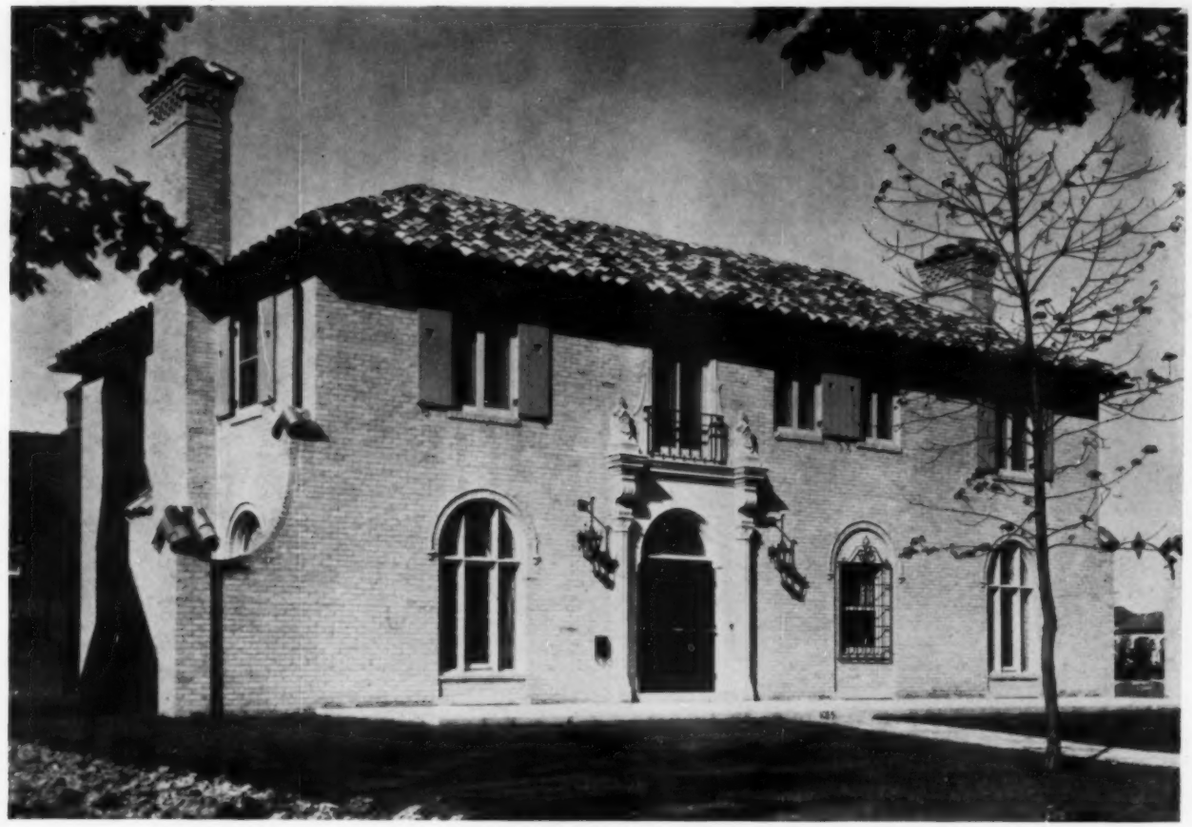
LABEAUME & KLEIN, ARCHITECTS, ST. LOUIS

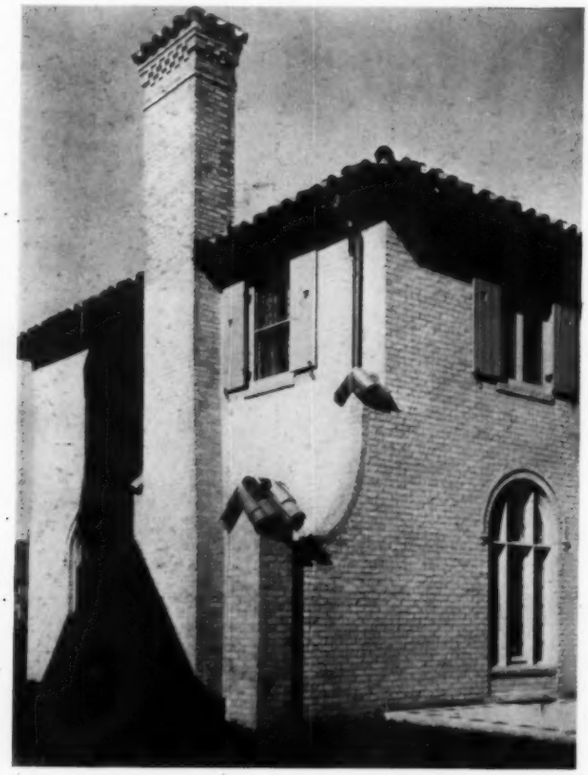


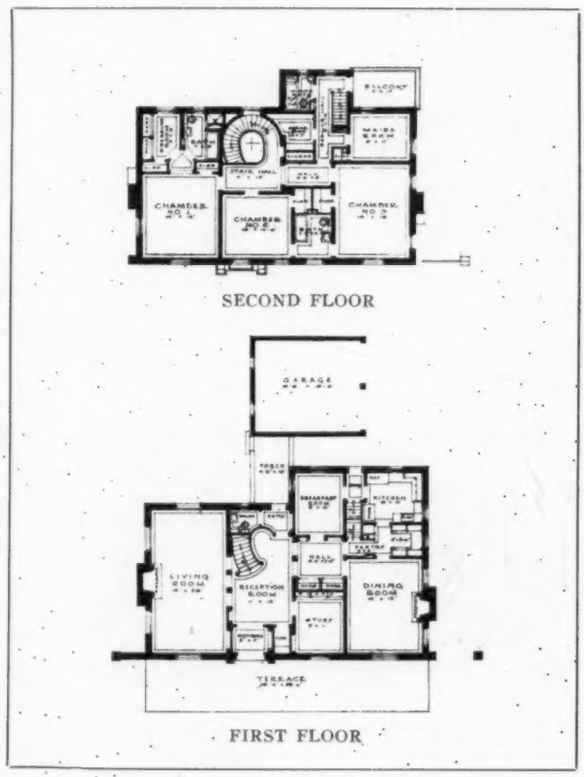
SEVENTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

ROBERT MAURICE TRIMBLE, ARCHITECT, PITTSBURGH



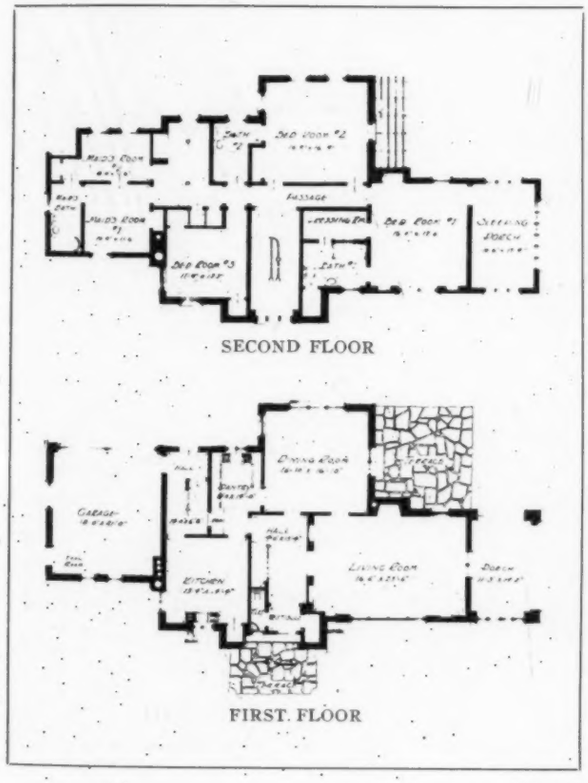




EIGHTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

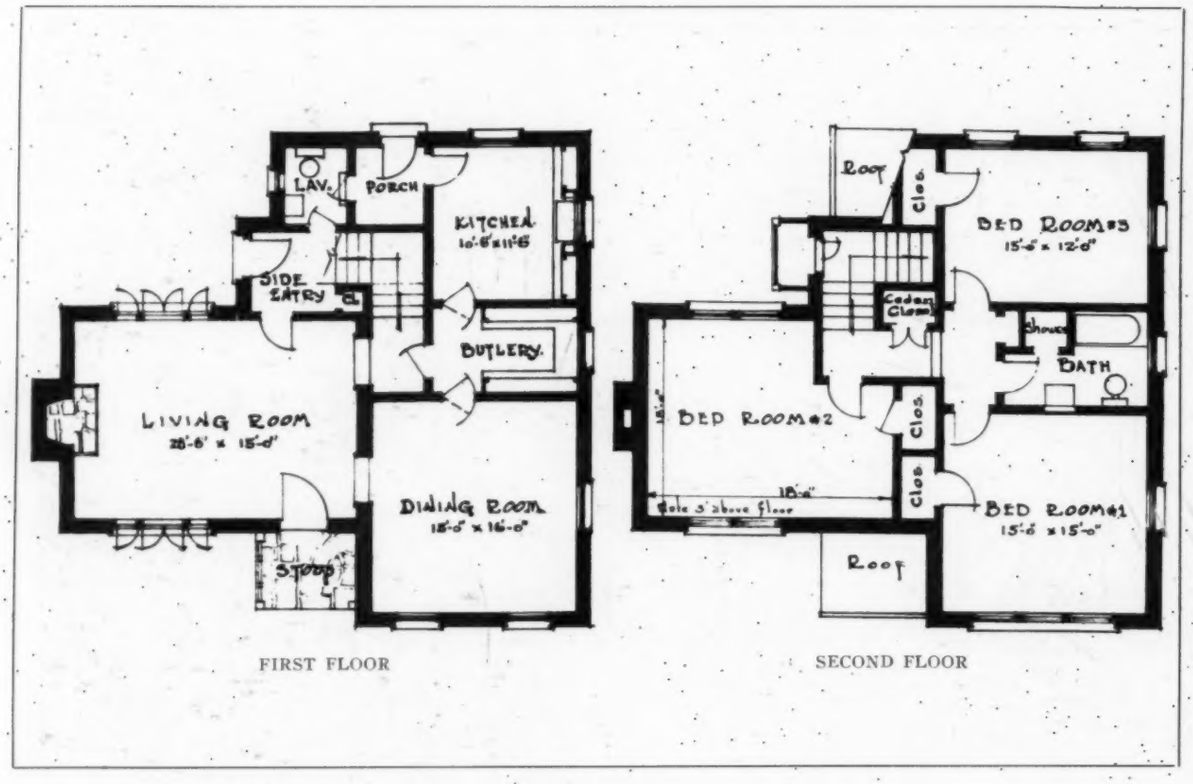
LaCROIX & MEMMLER, ARCHITECTS, MILWAUKEE



NINTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

LaBEAUME & KLEIN, ARCHITECTS, ST. LOUIS



TENTH MENTION

SECOND COMMON BRICK HOUSE COMPETITION

WILLIAM ADDISON McELROY, ARCHITECT, HOUSTON, TEX.

SPECIAL MENTION

SECOND COMMON BRICK HOUSE COMPETITION

WILLIAM T. BRAUN, ARCHITECT, CHICAGO

SPECIAL MENTION

SECOND COMMON BRICK HOUSE COMPETITION

ROBERT O. DERRICK, ARCHITECT, DETROIT

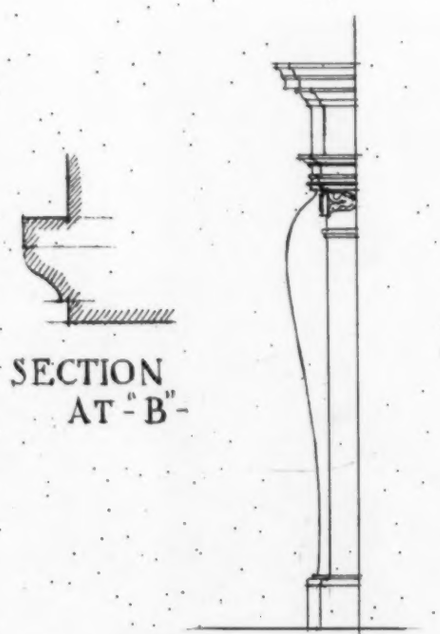
INTERIOR ARCHITECTURE

DETAILS, BOODLE'S CLUB, LONDON, PART II

Measured and Drawn by RICHARD EVERETT, JR.

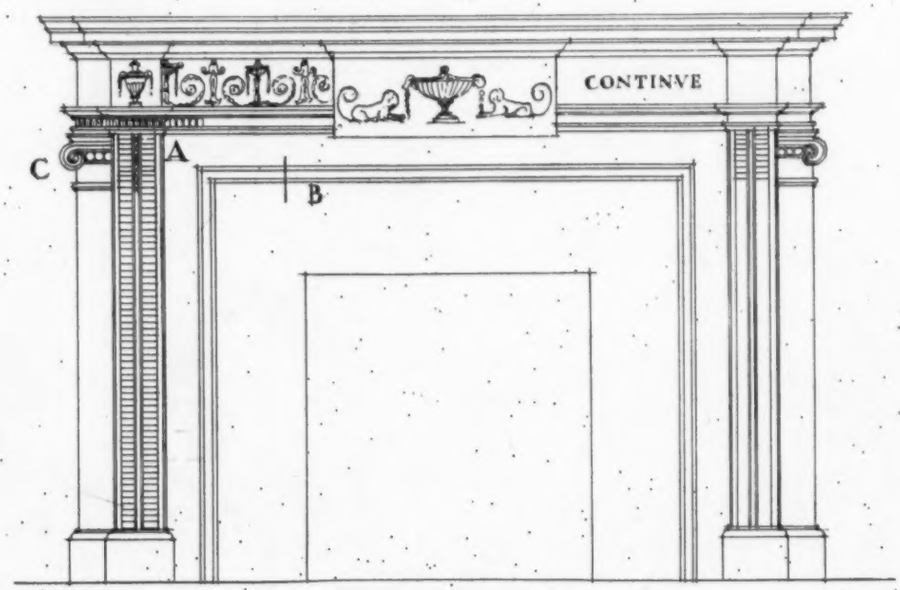
Photo. Paul J. Weber

One of the most interesting examples of the work of the brothers Adam, the front elevation shows an unusual treatment of balanced bays and a beautifully proportioned Palladian window. The omission of a continuation of the attic treatment above the center pediment is open to criticism in so small a facade



SECTION AT "B"

SIDE ELEVATION

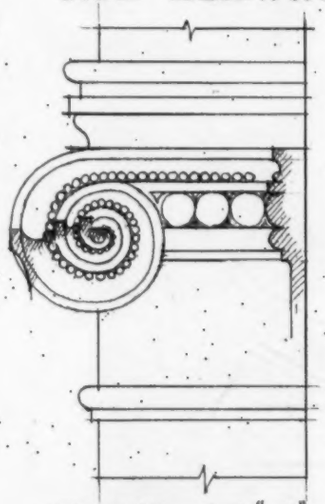


ELEVATION

SCALE
0 1 2 FT.

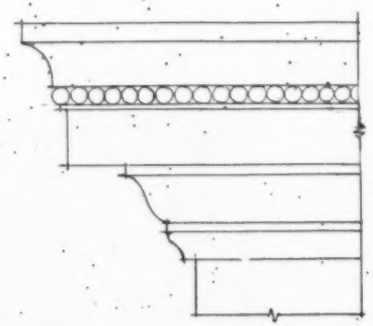
MARBLE MANTEL
IN SALON

BOODLE'S CLUB
LONDON

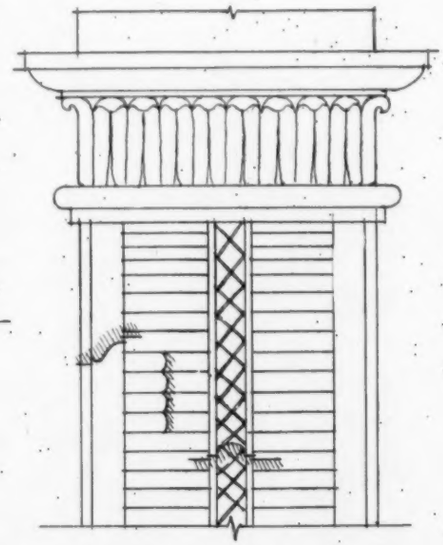


DETAIL AT "C"

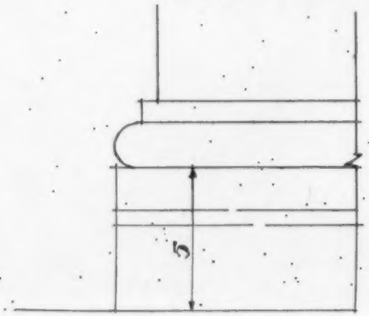
SCALE OF DETAILS
0 1 2 3 4 IN.



DETAIL OF CORNICE



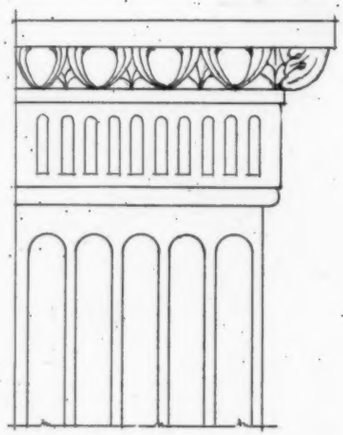
DETAIL AT "A"



DETAIL OF BASE

DETAIL OF BASE

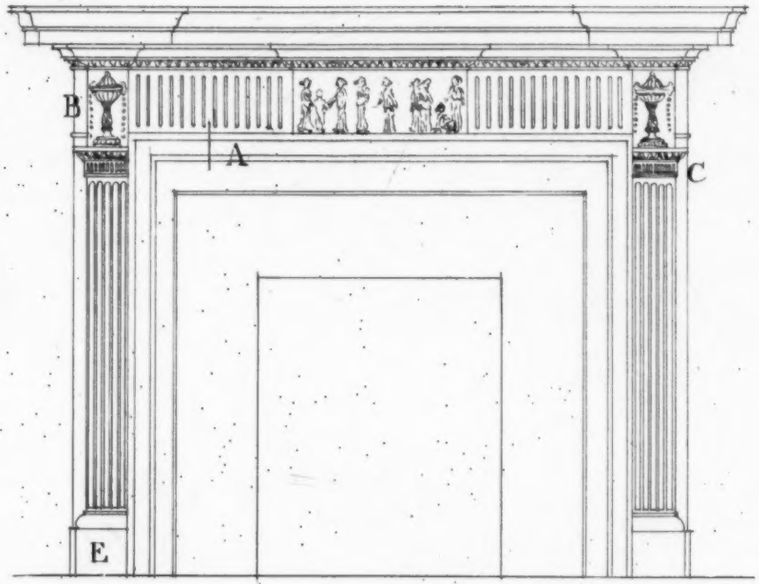
DETAIL AT "B"



DETAIL AT "C"

SCALE OF DETAILS

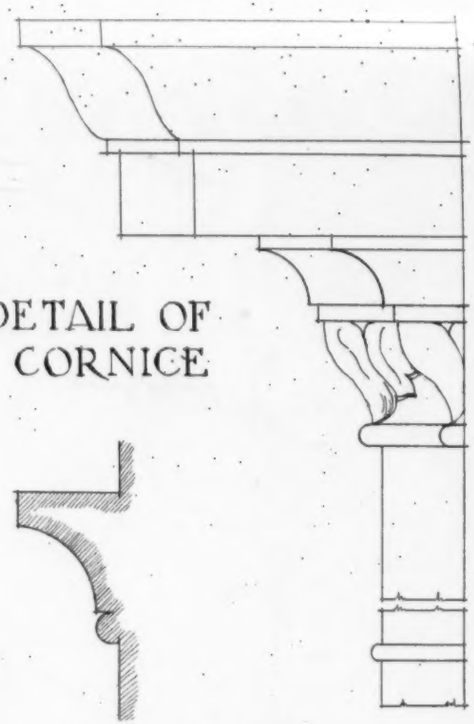
0 1 2 3 4 IN.



ELEVATION

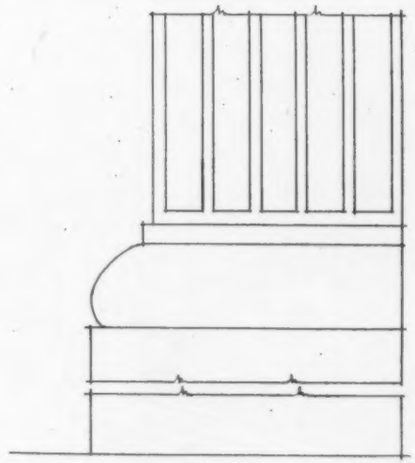
SCALE

0 1 2 FT.



DETAIL OF CORNICE

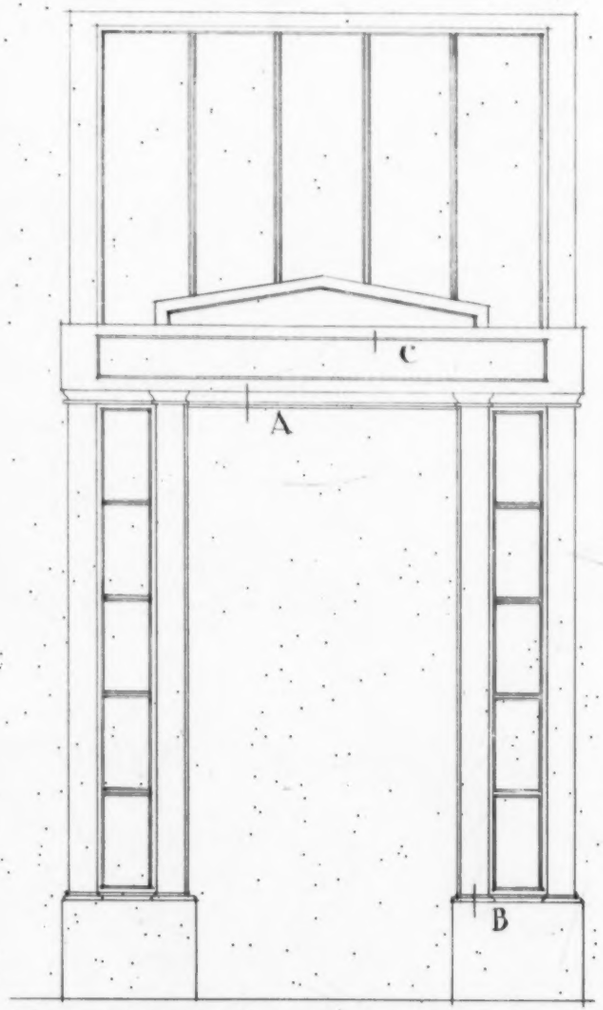
SECTION "A"



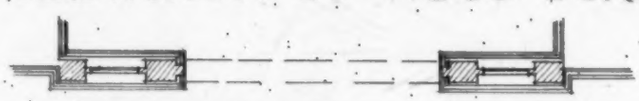
BASE AT "E"

MARBLE MANTEL
IN READING ROOM

BOODLE'S CLUB
LONDON



ELEVATION OF WOOD SCREEN

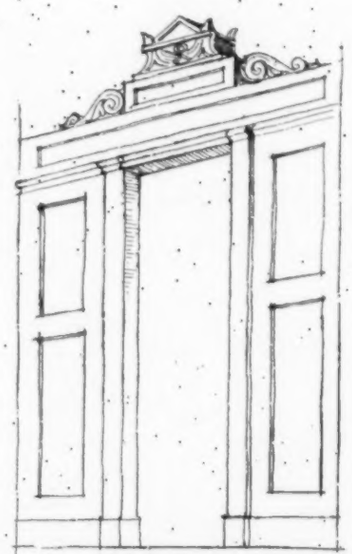


PLAN

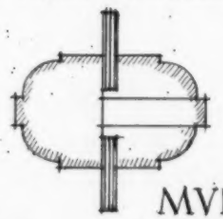
SCALE

0 1 2 FT.

TWO DETAILS ON A DOOR PEDIMENT



ANOTHER SCREEN



MVNTIN

DETAIL AT-"A"-

DETAIL AT-"B"-

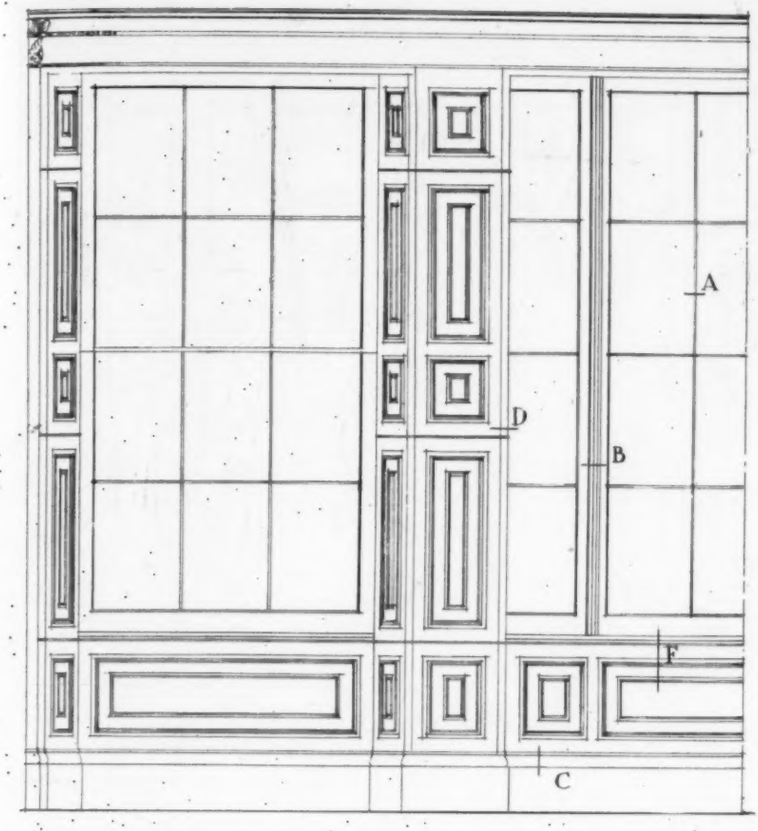
BOODLE'S CLVB

LONDON

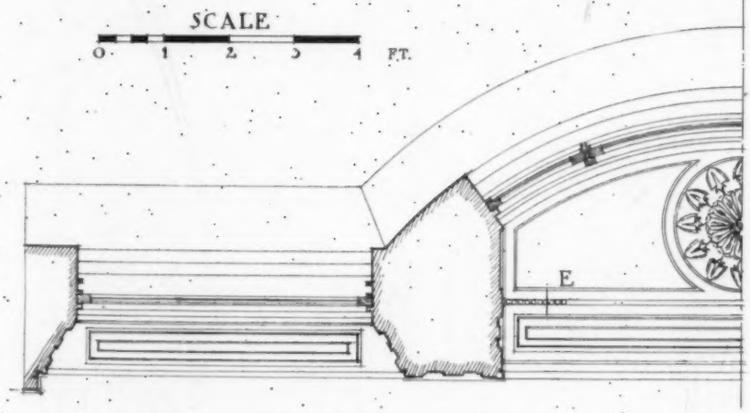
SCALE OF DETAILS

0 1 2 IN.

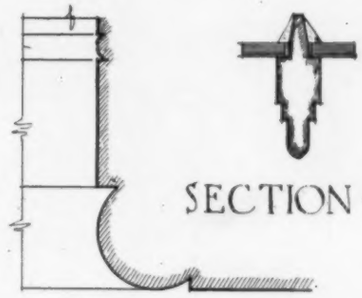
DETAIL AT-"C"-



HALF ELEVATION

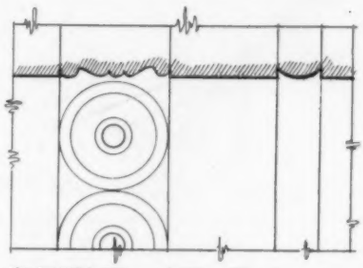


HALF PLAN

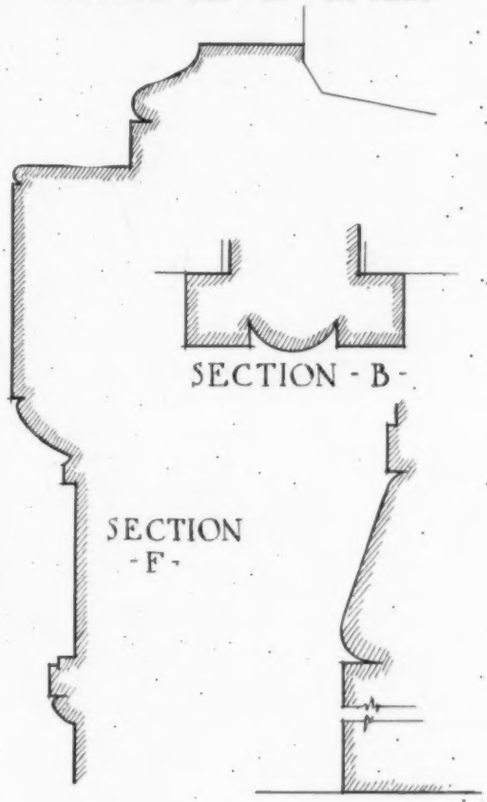


SECTION - A -

SECTION - D -



DETAIL AT - E - IN PLAN



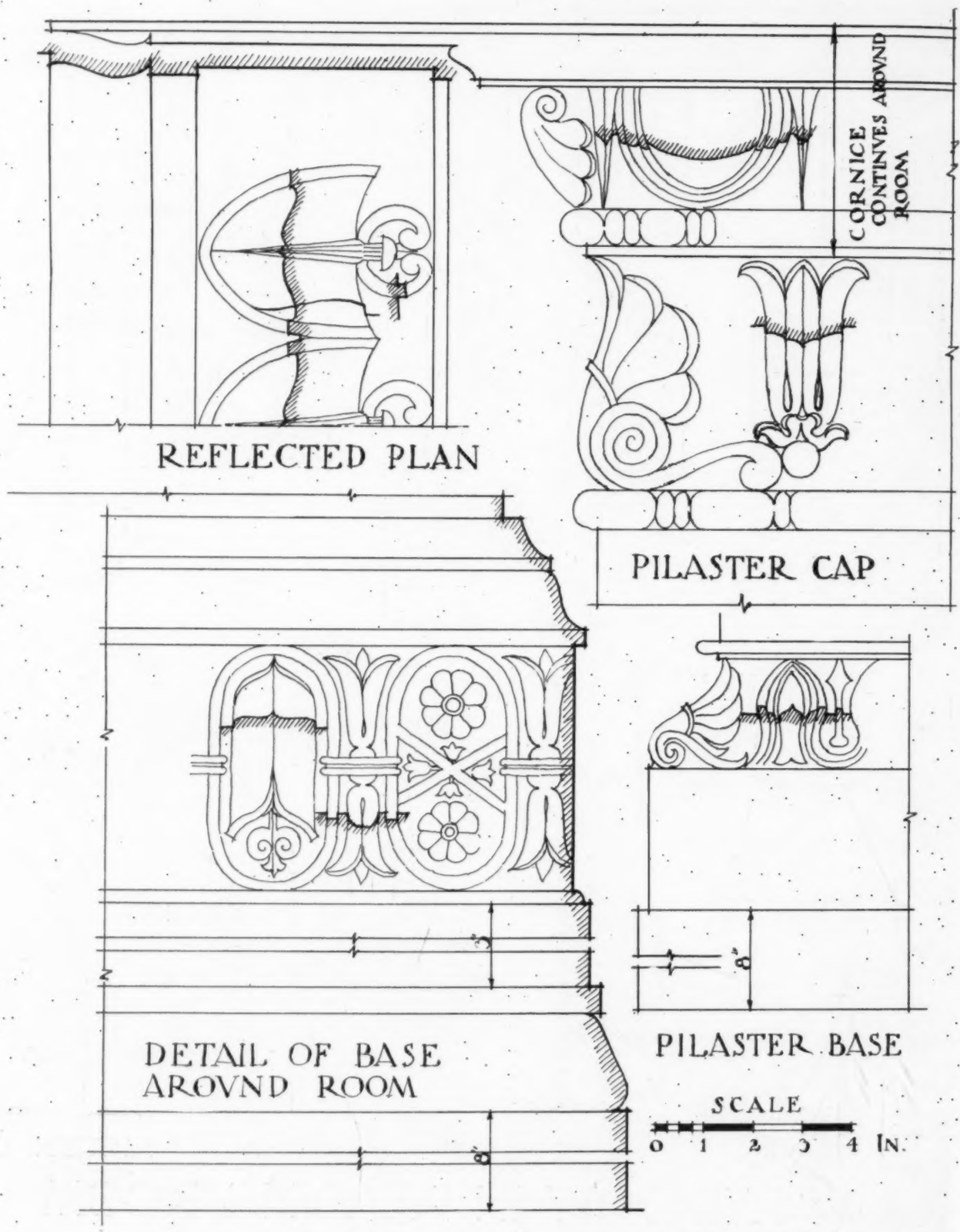
SECTION - B -

SECTION - F -

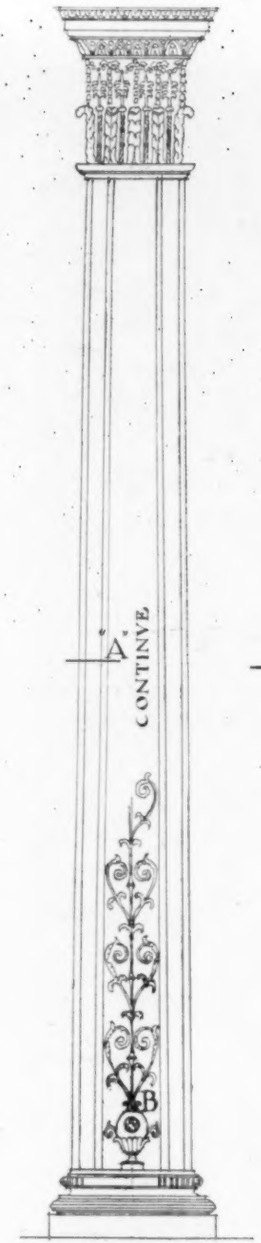
SECTION - C -

BOW WINDOW IN READING ROOM
BOODLE'S CLUB
LONDON

SCALE OF DETAILS
0 1 2 3 4 IN.



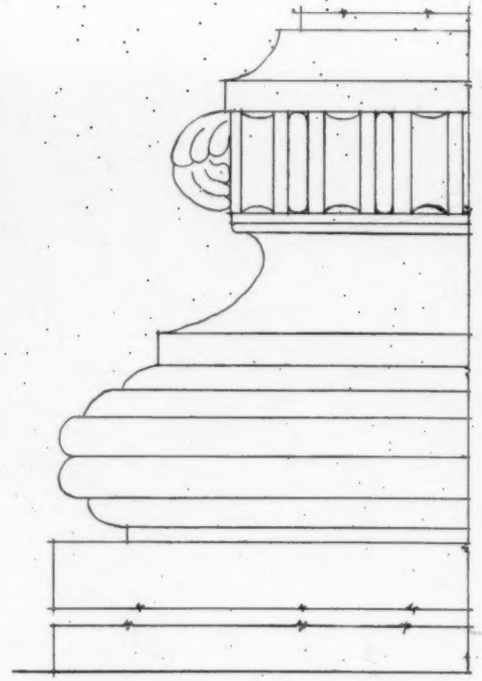
DETAILS IN READING ROOM
BOODLE'S CLVB
LONDON



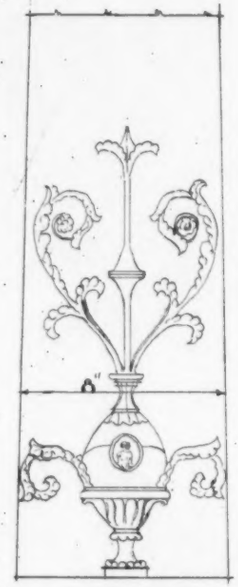
ELEVATION

SCALE

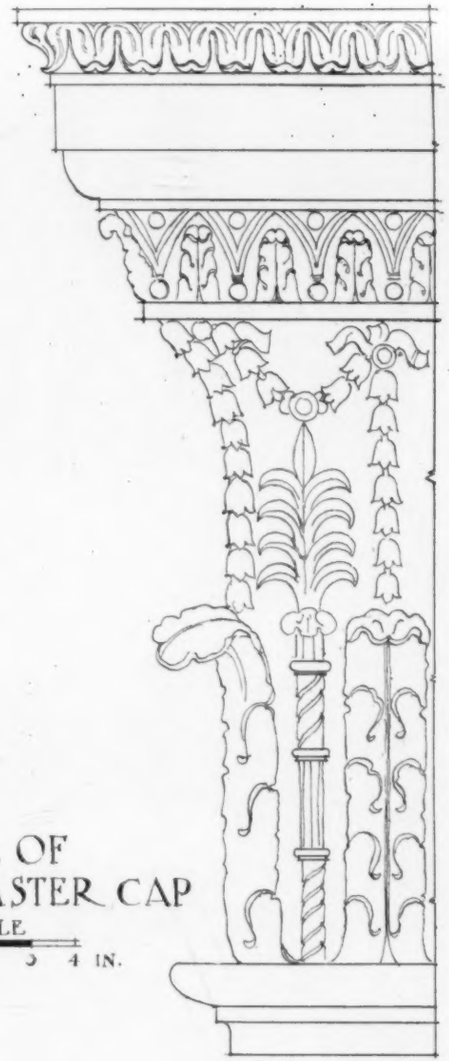
0 1 2 3 FT.



DETAIL OF BASE



DETAIL AT "B"



DETAIL OF PILASTER CAP

SCALE

0 1 2 3 4 IN.

SECTION AT "A"

PILASTER IN SALON

BOODLE'S CLUB

LONDON

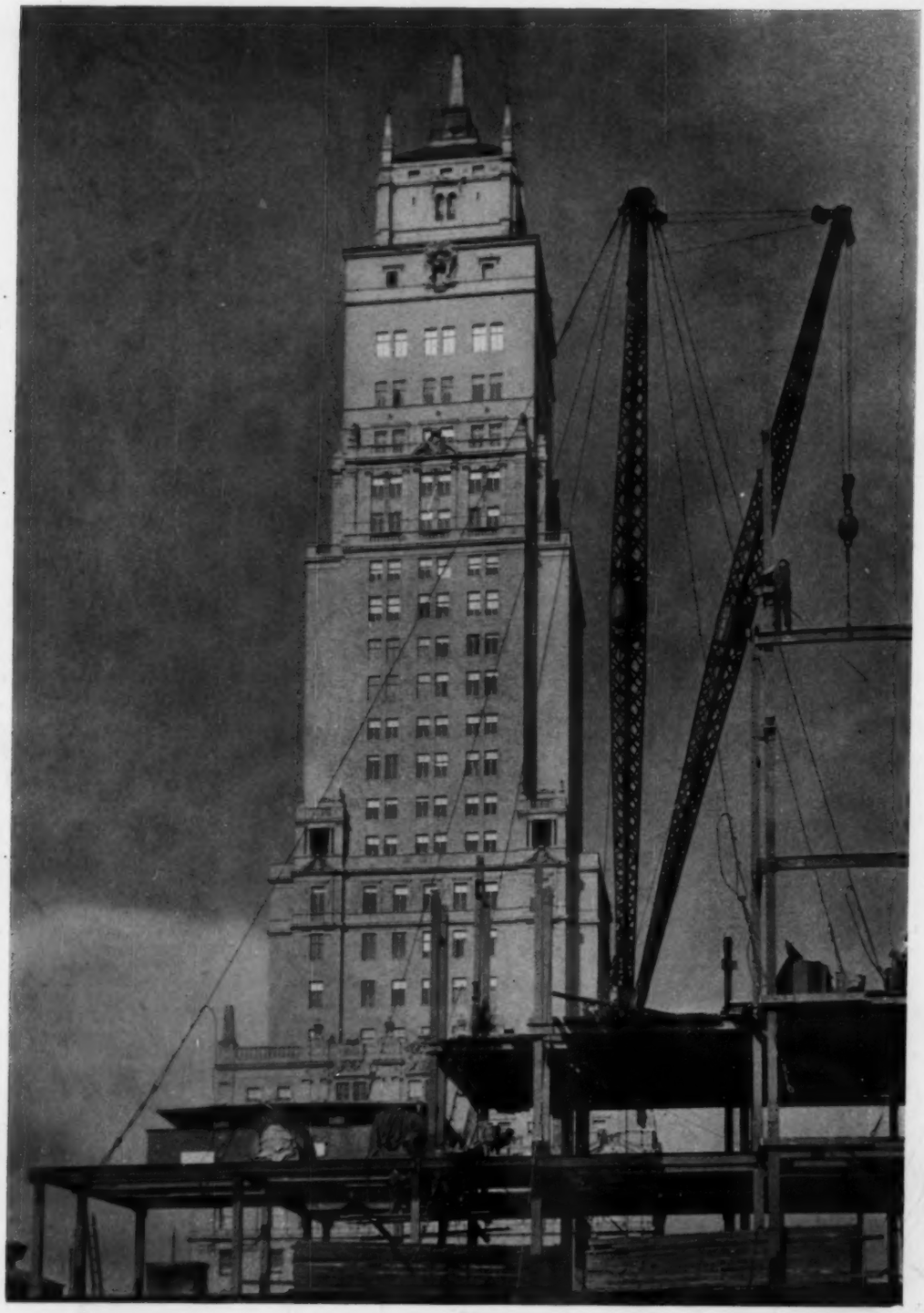
SCALE OF DETAILS

0 1 2 3 IN.

SMALL DINING ROOM IN THE GEORGIAN STYLE

Photo. John Wallace Gillies

Walls paneled with mouldings painted mustard color contrast successfully with the blue rug, draperies, and mahogany furniture. The overmantel painting and the rich brown marble bolection fireplace moulding are antique



CONSTRUCTION, IN PROGRESS, AND COMPLETE

FROM A CAMERA STUDY BY P. A. NYHOLM

THE
ARCHITECTURAL
FORUM

VOLUME XLVIII · NUMBER ONE

JANUARY 1928

INSULATION FOR RESIDENCES

BY
GORDON B. WILKES
ASSOCIATE PROFESSOR OF INDUSTRIAL PHYSICS, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

IN recent years the public has taken a very real and constantly increasing interest in the conservation of heat in homes. This has been due in large part to the increase in the cost of fuel for heating, to the gradual adoption of use of oil and gas-fired heaters, and to the extensive advertising campaigns of various manufacturers of insulating materials as well as to a desire for more comfortable housing. The industrial engineer has long been familiar with the savings due to efficient insulation. The almost universal custom of insulating steam pipes, boilers, furnaces, ovens, kilns, refrigerators and cold storage warehouses shows how fully this is appreciated. Perhaps it is not quite so well understood that insulation can usually be used to advantage wherever a loss of heat occurs through the walls of any enclosure.

In the case of residences, practically all of the fuel used in the heating system serves to replace the heat lost through the walls, roof, windows and doors. Proper insulation will minimize the loss of heat through the walls and roof, but of course it will not affect the loss from the windows, and weather strips or, better still, both double windows and weather-strips, should be provided. In a discussion of insulation for houses, it is always well to bear in mind the fact that windows and doors are sources of great heat loss and, consequently, that the greater the percentage area of the windows and doors the smaller will be the effect of wall and roof insulation in the saving of fuel. For example, the heat loss from a particular residence might be such that 45 per cent of the total loss is through the doors and windows, while 55 per cent is lost through the walls and roof. If excellent insulation is applied throughout, the heat loss through the walls and roof might be reduced by one-half. The total heat loss from the house, however, will not be reduced 50 per cent but only 50 per cent of the 55 per cent lost through the walls and roof, or 27.5 per cent.

In return for an investment in insulation, one can fairly assume that one will receive these advantages, the relative extent of which depends upon the type and thickness of the insulating material and also upon the relative area of windows and doors as compared with the walls and roof:

1. Saving in fuel cost of from 10 to 40 per cent.
2. Saving in size of heating system.
3. More uniform temperature distribution, with elimination of drafts.
4. A cooler house in warm weather, and particularly in the upper story.
5. Possibility of using the more expensive, but more reliable or convenient fuels, such as gas or oil, with less difference in cost.

Types of Insulation. The insulating materials generally used for house insulation may be roughly divided into four classes,—rigid boards, flexible sheets, cast, and loose materials. The rigid board type of insulation is in most common use today and is represented by such materials as cork board, fiber board, mineral or rock wool boards, and plaster boards. Cork board is made by compressing granules of pure cork into moulds and baking at a moderate temperature. No binder is required, as the natural gums of the cork itself serve this purpose. This material is generally furnished in blocks 1 foot wide, 3 feet long, and from 1 to 4 inches thick, the usual thickness for house insulation being from 1½ to 2 inches. Mineral or rock wool boards are made from slag or rock wool, felted and pressed, with or without binder, into blocks similar in dimensions to those of cork board. The fiber insulating boards are made by compressing wood, bagasse (sugar cane fiber) or other vegetable fibers, with or without binder, into large sheets approximately 4 feet wide, 8 feet long, and about ½-inch in thickness, one or two layers being commonly used in walls of dwelling houses. Wall boards of gypsum between two layers of heavy paper are also made, for insulating purposes, in large sheets similar to the fiber boards. Plaster can be applied directly to cork or fiber, thus saving some expenditure for wood or metal lath. In the case of frame houses, the insulating boards are usually applied on the inside of the studs, but they can be applied to the outside as well, if there is suitable protection from the weather. For brick, stone, tile or concrete walls, the insulating boards are applied on the inside, usually with the aid of furring strips.

The flexible types of insulation are represented by sheets made of fibrous materials, such as cattle hair, waste flax, eel grass, etc., covered with paper

or cloth. These are used as fillers between the studs in frame houses and may be applied to walls of brick, tile, stone or concrete with the aid of furring strips. Material of this type is frequently furnished in rolls, 1 yard wide and from ⅜-inch to 1 inch in thickness. There is a gypsum preparation, which when mixed with water can be poured in place, and after setting it gives a cast cellular gypsum insulation. This is between 2 and 4 inches thick as commonly installed. There are also on the market a number of materials that can be used in the form of loose powder or fibers, especially as a filler between the studs of a frame dwelling, or between attic floor joists. Typical materials are sawdust, cork dust, diatomaceous earth, mineral and rock wool, and eel grass.

Factors Determining Choice of Insulation. Some of the factors that would aid in choosing insulation are: cost of material; cost of application; weight; thickness; strength; fire resistance; vermin resistance; thermal conductivity; effect of moisture and water; permanence; decay or deterioration; settling; ability to take plaster coat; etc.

The cost of insulating materials varies so much with the different types, different localities, and with the different methods of application, that it would be of little value to attempt to give cost data. Where thin insulating boards replace the sheathing and laths, the additional cost of insulation will be very small. Where insulating material of good quality and of 2-inch thickness is applied, the cost is likely to run as high as 5 per cent of the cost of the dwelling, but fuel cost will be reduced and comfort increased.

Properties of Insulating Materials

Type of Insulation	Weight in lbs. cu. ft.	Thermal Conductivity	Fire Resistance
Rigid			
Cork	10	0.30	Slow-burning
Mineral and rock wool boards	12-20	0.3-0.5	Non-combustible
Fiber boards	12-20	0.3-0.5	Slow-burning
Plaster boards	30-60	0.8-1.5	Non-combustible
Flexible			
Eel grass between paper	5-8	0.25-0.30	Slow-burning
Cattle hair and flax fiber between paper or cloth	8-15	0.3-0.4	Slow-burning
Cast			
Cellular gypsum	12-30	0.4-0.9	Non-combustible
Loose			
Diatomaceous earth	10-30	0.3-0.5	Non-combustible
Mineral and rock wool	12-30	0.3-0.5	Non-combustible
Eel grass	5-8	0.2-0.4	Slow-burning

The coefficient of thermal conductivity in this table is expressed in B.t.u., per hour, per sq. ft., per *inch* of *thickness*, per 1°Fahr., temperature difference between the *surfaces*.

Calculation of Heat Losses. The effectiveness of any material used as an insulator to prevent the passage of heat depends upon a peculiar characteristic property of the material itself. Just as iron is heavy, strong and tough, and glass is heavy and brittle, and wood is light and tough, so are they possessed of another quality which unfortunately has no name quite as expressive as weight or strength or hardness, but which we call "thermal conductivity."

In a general way, materials which are soft, light, porous and fluffy are good heat insulators, and we

TABLE OF HEAT

TYPE OF INSULATION			ROOFS					
			Tile or slate on wood sheathing		Shingles, sheathing and studding		Shingles, sheathing stud, lath & plaster	
No insulation			0.82		0.35		0.30	
	Thickness	K.		Saving		Saving		Saving
Cork board.....	1″	0.3	0.22	73%	0.16	54%	0.15	50%
	2″	0.3	0.13	84%	0.10	72%	0.10	67%
Fiber boards.....	0.5″	0.4	0.40	51%	0.24	31%	0.22	27%
	1″	0.4	0.27	67%	0.19	46%	0.17	43%
Rock wool boards	2″	0.4	0.16	81%	0.13	63%	0.12	60%
Eel grass in paper	0.3″	0.25	0.42	49%	0.24	31%	0.22	27%
	0.5″	0.25	0.31	62%	0.20	43%	0.19	37%
	0.8″	0.25	0.23	72%	0.16	54%	0.15	50%
Cattle hair or flax	0.5″	0.35	0.39	53%	0.23	34%	0.21	30%
Plaster boards....	0.5″	1.0	0.59	28%	0.29	17%	0.26	13%
Cellular gypsum...	2″	0.7	0.41	50%	0.17	52%	0.16	47%
Mineral wool loose	2″	0.4	0.16	81%	0.13	63%	0.12	60%
Diatomaceous earth	2″	0.4	0.16	81%	0.13	63%	0.12	60%

Rate of Heat Transmission Expressed in B.t.u., per Hour, per Sq.
Coefficient of Thermal Conductivity "K" Expressed in B.t.u., per Hour, per Sq.

say that they have a low thermal conductivity, or that they are poor heat conductors. Materials that are dense and heavy are usually good conductors of heat, and have what we call high thermal conductivity. The numerical index of this property is commercially called the coefficient of thermal conductivity, and it is not unusual to speak of a material as having a coefficient of thermal conductivity of 0.3, whereas common red brick have a coefficient of thermal conductivity of 5.0. Stating it even more precisely, we might say that a certain material 1 inch thick and 1 foot square has such a characteristic thermal conductivity that it would transmit 0.3 of a heat unit (British thermal unit) per hour, when the two surfaces of the sheet were 1°Fahr. apart in temperature. In the same way we might say that a layer of brick of similar dimensions would transmit 5.0 heat units per hour. It will be seen that this matter of conductivity is a characteristic of the material like light weight or color, and that it has nothing to do with the manner in which the material is used. It must be noted, however, that if heat travels through a sheet of insulating material, it must come from somewhere on one side and go somewhere on the other, and in entering and escaping from the sheet it encounters a resistance which in some cases is quite as important in delaying the passage of heat as is the conductivity of the material itself. This characteristic resistance of entry and exit depends to a great extent upon what kinds of things are in contact with both sides of the insulating sheet. If there is air upon both sides, the resistance of entry and exit may be considerable. If the sheet is enclosed with other material of the same sort, the resistance is very small. It will be seen, therefore, that it is by no means a simple matter to compute the rate at which heat will pass through a wall of insulating material unless we know with considerable precision its nature, its thickness, and the nature of the adjacent materials.

It is to be regretted that a good deal of confusion has arisen about this matter, and that although most of the materials have been carefully tested, and there are published figures available showing the characteristic coefficient of thermal conductivity, there is also a large amount of published matter in which the coefficient of thermal conductivity and the resistance to entry and exit of the heat from the surface are somewhat confused. Much of the data obtained by using the so-called "box method" of testing materials are difficult to use intelligently because of the failure of many of the early experimenters to distinguish between the resistance offered by the material to heat traveling through it and the resistance to entry and exit of the heat under the peculiar circumstances of the particular test quoted. Recently the Insulation Advisory Committee of the National Better Business Bureau has adopted standard methods of testing in regard to insulating materials.

The "plate method" is without doubt the most precise means of measuring thermal conductivity, but the "box method" is open to considerable objection when used to compare insulating materials for dwellings. Box test data, giving "air to air" transmission values, are only applicable in these cases:

1. When the wall is composed only of insulating material, and box tests are made on the same

TRANSMISSION RATES.

WALLS									
Clapboard, sheathing, stud, lath & plaster		Clapboard, paper, stud, lath & plaster		8″ brick, furring, lath & plaster		4″ tile, stucco & plaster		Stucco, stud, lath & plaster	
0.28		0.31		0.27		0.40		0.45	
	Saving.		Saving.		Saving.		Saving.		Saving.
0.15	46%	0.15	52%	0.14	48%	0.17	58%	0.18	60%
0.10	64%	0.10	68%	0.10	63%	0.11	73%	0.11	76%
0.21	25%	0.22	29%	0.20	26%	0.26	35%	0.29	36%
0.16	43%	0.18	43%	0.16	41%	0.20	50%	0.21	53%
0.12	57%	0.12	61%	0.12	56%	0.13	68%	0.14	69%
0.21	25%	0.23	26%	0.20	26%	0.27	33%	0.29	36%
0.18	36%	0.19	39%	0.18	33%	0.22	45%	0.24	47%
0.15	46%	0.16	49%	0.15	45%	0.18	55%	0.19	58%
0.20	29%	0.22	29%	0.20	26%	0.26	35%	0.28	38%
0.25	11%	0.27	13%	0.24	11%	0.33	18%	0.37	18%
0.15	47%	0.16	49%	0.15	45%	0.19	53%	0.20	56%
0.12	57%	0.12	61%	0.12	56%	0.13	68%	0.14	69%
0.12	57%	0.12	61%	0.12	56%	0.13	68%	0.14	69%

Ft., per 1°Fahr. Temperature Difference Between the Air on Each Side
Ft., per Inch Thickness, per 1°Fahr. Temperature Difference Between the Surfaces

thicknesses of the various insulating materials.

2. When an insulating sheet is placed in the middle of a large air space.

Both of these conditions are rarely found in actual practice. In every case the relative value of a poor insulator and a good insulator will be closer on an overall or "air to air" basis than when compared by the coefficients of thermal conductivity as found by the "plate method." If it is desirable to find the rate of heat transmission through a built-up section of insulated wall, such as clapboards, paper, sheathing, studs, cork and plaster, the "box method" is an excellent means to adopt, but I feel certain, after 17 years of almost constant experiment with both methods, that the "box method" is of very little aid to the architect as a means of determining the relative insulating value of different materials unless all the special conditions connected with the test are known. It is my opinion that one should compare relative insulating values of materials by comparing their coefficients of thermal conductivity rather than overall or "air to air" transmission values.

The effectiveness of an air space as an insulator is frequently over-estimated, especially in the case of a well insulated wall or roof. It is doubtless true that minute air spaces, properly confined, help to make excellent insulating materials, but the large air spaces found in wall and roof construction are of minor importance as regards resistance to heat flow when compared to an inch or more of a good quality of insulation.

A few typical cases will illustrate the methods used in calculating the rate of heat transfer through insulated walls and roofs. There are many tables available which will give one an idea of the rate of heat loss through uninsulated walls, and from these the loss through an uninsulated wall of a certain type can be determined.

For example, the rate of heat loss from an 8-inch brick wall with furring, lath and plaster is found to be 0.27 B.t.u., per hour, per square foot, per 1° Fahr. temperature difference between the air on the two sides. If it is desired to find the effect of three different kinds of rigid insulation, applied between the brick and the plaster, one would first determine the thickness and the coefficient of thermal conductivity of the three types from tables or from reliable data submitted by the manufacturer. The data furnished might be thus expressed:

	Thickness	Thermal Conductivity
Sample A	0.5 inch	0.30
Sample B	0.5 "	0.60
Sample C	2.0 "	0.30

Let H represent the rate of heat transfer through the uninsulated wall,

H^1=rate of heat transfer through the insulated wall.

L=equals thickness of the insulating material.

K=thermal conductivity of the insulation.

Then the rate of heat transfer through the insulated wall, expressed in B.t.u. per hour, per square foot, per 1° Fahr. temperature difference between the air on each side would be equal to

$$H^1 = \frac{1}{\frac{1}{H} + \frac{L}{K}}$$

Thus with sample A

$$H^1 = \frac{1}{\frac{1}{0.27} + \frac{0.5}{0.30}} = \frac{1}{3.7 + 1.7} = 0.19$$

which represents a saving of heat loss through the wall of 30 per cent.

Similarly, sample B indicates a heat loss of 0.22 with a saving of 19 per cent, and sample C shows a heat loss of 0.096 with a saving of 63 per cent.

These savings apply to the wall, and if it is assumed that the same saving can be made by insulating the roof, and also that the loss through the windows and doors in this particular case is 45 per cent of the total loss, the actual saving of fuel would be for the three materials:

Sample A 0.30 x 0.55=17 per cent fuel saving.
Sample B 0.19 x 0.55=10 per cent fuel saving.
Sample C 0.63 x 0.55=35 per cent fuel saving.

The table included here has been assembled in order to indicate the order of magnitude of the heat loss from some typical walls and roofs when insulated by various types of materials of different thicknesses. The values for the coefficient of thermal conductivity (K) given for the different types of insulation are the average values from a great many samples submitted to the Laboratory of Heat Measurements during the past few years. The percentage of heat saved is also tabulated, and it only applies to wall or roof as the case may be and does not indicate the total percentage of heat saved for the entire building. The values taken for the heat loss through walls and roofs of uninsulated construction are average values assembled from published tables, and are necessarily somewhat uncertain, due to widely different conditions of exposure and the human factor in construction. It should always be kept in mind that as the conditions become worse, the effect of insulation is greater.

Summary. There is no longer any real excuse for not insulating a new dwelling. There is always a tendency for one to under-insulate, and I have yet to find a residence that has been over-insulated from an economic standpoint. If the percentage area of the windows and doors is not above the average, and if at the same time they are suitably protected from excessive loss of heat, I would recommend insulation that is equivalent to 2 inches of a material having a coefficient of thermal conductivity of 0.30, on the walls and roof of a dwelling where fuel prices correspond to those found in New England.

THE PROPER USE OF LACQUER

THE proved success of what is popularly known as "lacquer finish" on automobiles has created a tremendous interest in a wider application of these almost instantaneously drying materials. Research has been so stimulated among the finishing material manufacturers that developments have crowded the market to the point of confusion. People became so enthusiastic about their new automobile finish that they visualized its universal application in finishing, and have so tried it. The consequence has been varying degrees of success and failure, but there has been clearly demonstrated the need for much study, development and modification of products to meet specific conditions. Use of lacquer is decidedly not a "cure-all." Outstanding is the different performance of lacquer on a wood surface and on a metal surface. A nationally known railroad adopted lacquer for its finish. Its officials are satisfied, to date, with results on the metal parts of their steel cars, but they have been obliged to return to use of old methods on their wooden cars.

Lacquers are being specified more and more by architects, as they become familiar with the material and the causes of success or of failure in previous work. The failures have been due largely to a lack of understanding of the proper use of lacquer materials. There seems to be a need for an unprejudiced synopsis of the whole problem of the use of lacquer materials from the architect's point of view. In order to understand the essential elements of lacquer and its uses it would seem advisable to take up the subject in this order:

A. The Advantages to be Derived from the Proper Use of Lacquer.
B. The Disadvantages of Lacquer.
C. What Lacquer Really Is.
D. Considerations of the Use of Lacquer for Various Portions of the Architectural Finish.
E. The Application of Lacquer.
F. The Cost of Lacquer.

A. *The Advantages to be Derived from the Proper Use of Lacquer.* It will be observed that the words "proper use" have been chosen,—and with reason. The advantages to be derived from the use of the material are predicated on the specifying of the proper grade and composition of the lacquer, on the proper preparation of the surfaces to receive the lacquer, and on the proper application on these surfaces. The most distinct advantage of lacquer over other finishes is its quick-drying property. Where speed is necessary, lacquer can be used to great advantage. It is possible to apply several coats of lacquer in one day, a process that would require a week, in all probability, if paint and varnish were used. Speeding up the finishing work by using lacquer may result in the saving of a large amount of money in rentals and interest charges. In hotel work this is particularly true, as a room can be completely refinished in one day and be ready for occupancy the next, which would be obviously impossible with the older types of finishes. The same is true of hospital rooms or wards, as refinishing with lacquer allows the least possible interruption of service. Other advantages are the smoothness on metal surfaces which lacquer naturally assumes, due to its tendency to shrink when drying. It produces a very hard and tough surface that does not mar or scratch easily, and which is readily cleaned with little effort. It does not pick up the dirt or take the "grinding in" that varnish finishes usually do, and it will imitate a wax finish without the dust-collecting tendency of the latter. Lacquer can be made more transparent than any of the usual finishes and has a distinct advantage in producing a hard, clear, waterproof film.

B. *The Disadvantages of Lacquer.* From the architect's point of view, probably the greatest disadvantage at present is that lacquer requires different handlings, and different specifications and compositions for its various uses, and it therefore requires his careful study to insure its proper use. It also demands very careful preparation of the surface to which it is to be applied and an understanding consideration of the nature and condition of this surface to receive the finish. It is more exacting in its requirements than paint or varnish. The failures of lacquer have probably been due to choosing the wrong type of lacquer for the specific purpose, to a lack of care in the preparation of the surface, or to unskilled application of the lacquer. The properties of lacquer that are not to its advantage are its lack of elasticity, its relatively poor adhesion, its relatively small covering power, and the relatively thin film which it deposits. These disadvantages are due largely to the strong solvents which lacquer contains and its comparatively low solid content, as well as to the physical characteristics of its basic material. The solvents of lacquer will often attack oil and spirit stains, and with some lacquers only water stain is unaffected. It is not possible to obtain with lacquer the high luster of various varnishes and oil enamels. A disadvantage at present in the use of lacquer is the difficulty of obtaining artisans skilled in its application. The usual journeyman painter must unlearn a good deal of his paint and varnish technique in order to apply lacquer quickly and easily.

C. *What Lacquer Is.* The term lacquer has come to take on a new and rather definite meaning in architectural work. Lacquer as formerly understood was associated with the finishes on Chinese, Japanese and Hindu cabinet work and furniture. It was also applied to finishing materials such as shellac and spirit varnishes. There are now "flexible lacquers," of comparatively recent development, which are fast-evaporating solutions of a solid ingredient which has good building properties and retains flexibility. This ingredient may be a pre-oxidized varnish, involving a special processing of a resin and oil combination, or it may be a synthetic plastic material. In either

case, the solid is compatible with nitro-cellulose, and most of these laquers contain some nitro-cellulose as a hardener.

The term "lacquer" in the rest of this article will be limited to the nitro-cellulose base lacquer, or pyroxolin lacquer. The rather formidable word, nitro-cellulose, is merely a chemically descriptive term for the basic material of lacquers; nitrogen is combined with cellulose to form this material. The cellulose is of the same chemical nature as starch, and for the manufacture of lacquer short-fiber cotton is usually used as the cellulose content. The "cotton linters," as the short-fiber cotton is called, is that portion of the cotton left after the long fiber has been removed for the manufacture of cloth. The nitrogen is obtained from nitric acid in a process in which sulphuric acid is used to take up the water formed in the reaction of the cellulose and the nitric acid. At the completion of the elaborate process, which involves several other steps, including dehydration, the nitro-cellulose has the same appearance as bleached cotton linters. To this basic nitro-cellulose material are added solvents, guns, plasticisers, and perhaps pigments, in various proportions and of various kinds, depending on the type or purpose of the grade of lacquer being manufactured. The similarity between lacquer and varnish is easily seen by comparing the main ingredients of each:

Lacquer	*Varnish*
Nitro-cellulose (pyroxylin)	Linseed Oil
Gum	Gum
Solvents	Turpentine
Pigment	Pigment

The great difference is in the characteristics of the basic materials,—the pyroxylin dries hard in a short time as the volatile solvent evaporates, whereas the varnish merely "sets" as the turpentine evaporates, and the hardening is gradual as the oil oxidizes through its contact with air. The latter is therefore a two-stage process involving considerable time, the former a quick, one-stage hardening. Lacquer has not the film-building quality to the same extent as varnish, since it contains a relatively high percentage of volatile material, from about 70 per cent to 80 per cent, and a good varnish contains approximately 55 per cent. The resulting films naturally correspond to the non-volatile content which remains on hardening, and this explains why the film from a single application of lacquer is about half as thick as that from varnish.

One outstanding difference between a high content nitro-cellulose film and varnish film is that the former dries to a hard film of great tensile strength, whereas the latter dries to a more plastic, yielding film. When a lacquer film is freshly applied, a certain quantity of slow-evaporating solvents is retained in the film. These emerge gradually over a period of time, causing the film to *contract* or tighten. A fresh varnish film absorbs oxygen from the air with a consequent *increase* in weight and volume, and continues to do so throughout its "life." We might say that the two films are opposite in their nature,—the lacquer always contracting and the varnish always expanding. This is an important consideration, as will be seen later.

D. *Architectural Uses of Lacquer.* The various considerations and conditions which the architect should understand in order that lacquer may be properly used will be mentioned here in this order:

1. Preparation of Surfaces Generally.
2. Use of Lacquer on Wood.
3. Use of Lacquer on Metal.

1. *The preparation of the surface* for lacquer finishing is an extremely important factor, a factor which in many cases determines the success or failure of the work. The surface must be absolutely dry and free from wax, grease, mineral oils, dust and dirt. The importance of this may be realized when one considers that a small piece of paraffin, if dropped into several gallons of lacquer, would ruin it by retarding its drying. Lacquer should never be used over old wax finishes nor over surfaces that have been cleaned with a paint remover or varnish remover which contains any wax.

2. *Use of Lacquer on Wood.* Lacquer makes a desirable finish for wood trim because of its hardness and its ability to stand considerable abuse without marking. The contracting tendency of lacquer has considerable effect on the appearance of the finish and its physical characteristics. When used over an unfilled open-grained wood it tends to emphasize this character of the wood as it does not fill the grain as varnish does. Lacquer lacks the filling and smoothing qualities of varnish. It will emphasize rather than correct the roughness or openness of the wood.

Close-grained woods do not offer the problem presented by open-grained woods, unless the latter are to receive an "open" or "un-filled" finish. If the wood is to be filled, it is an unfortunate circumstance that colored fillers, particularly those used on mahogany and walnut finishes, are likely to give serious difficulty. There is a tendency for the slow solvents in lacquer to settle in the pores, and over a period bleach out the coloring matter from around the pigment filler and eventually give the pores an unsightly gray or perished appearance. With many fillers this action will be pronounced in a few hours, while with others the effect, though gradual, is none the less eventually displeasing. This "graying" can be prevented only by the application of a coat of shellac or a special quick-drying insulating coat before lacquering; but if either of these methods is employed, the lacquer film is rendered tender. The alternative for this would be the specifying of a cotton base material which would do the staining and filling in a single operation. Such products are on the market, and being usable with lacquers, they produce satisfactory finishes. The drawback is their having a somewhat limited range of suitable and unaffected staining colors.

The question of stains and fillers to be used with lacquer is most important. An oil stain or spirit stain should not be used under lacquer, unless a lacquer has been thoroughly tested over the particular stain. The manufacturer should be consulted in regard to the best type of stain or filler to be used in connection with his product for the particular purpose in hand. Shellac underneath lacquer destroys its toughness and makes it tender in direct proportion to the film thickness of the shellac. It would be wrong to say that shellac should never be used under lacquer; but if it is necessary, it should be as thin a coat as possible, consistent with the particular case.

Wood expands and contracts only *across* the grain, and not *with* the grain to any extent. When wood is exposed to temperature changes, the film which is anchored to it contracts and expands in all directions, whereas the surface of the wood to which it is attached moves only in one direction. This is why "temperature" or "cold cracks" of varnish and lacquer films are always at right angles to the grain of the wood. The greatest difficulty with wood is its absorption of moisture. During a year, the moisture content of wood will vary by many per cent. It is always thirsty for moisture, and during humid periods soaks up all it can get. This results in a pronounced "swelling." The movement is *across* the grain of the wood. It is this pressure which causes what are known as "humidity cracks" in lacquer and varnish films, and is why such fractures always run directly *with* the grain of the wood. Because of their great strength, lacquer films are quite resistant to cold checking, but are very likely to fail under the far more compelling and cumulative forms of moisture swelling of wood; in fact, "humidity checking" on wood surfaces may be considered one of lacquer's greatest drawbacks. Varnish films are more yielding and plastic, and even should they fail, they often close up, as far as the eye can see, when the wood returns to a normal state. Lacquer's failures remain visible to the eye.

Exterior Woodwork. Most forms of present-day lacquer are absolutely unsuited for use on exterior woodwork or on wood surfaces exposed to moisture. The lack of flexibility of the nitro-cellulose lacquers is an inherent characteristic. All wood exposed to moisture and atmospheric changes swells and shrinks; the lacquer is not elastic enough to expand and contract with the wood, and the consequence is that the lacquer is liable to crack and peel or scale.

Floors. Due to its hardness, durability, resistance to wear and abrasive marks, good lacquer seems to be well adapted for the finishing of floors. The hardness of the finish is resistant to the constant "grinding in" of dirt to which the floor is subjected. The floor may be given a finish approximating a wax finish but which will be much easier to keep clean, as the dust remains free on the surface rather than becoming embedded in the finish.

Walls. Although walls offer the largest amount of surface to be finished in a building, they are not always best adapted to take lacquer. It is essential that plaster walls be thoroughly dried out and "cured" before applying lacquer. That means that it is practically impossible to use lacquer on the plaster walls of new buildings to speed up such finishing. However, it can be used to advantage where speed is a requisite in refinishing walls such as those of hotel or hospital rooms so that they may be occupied without delay. Lead and oil finishes for walls may turn yellow as they age and oxidize; lacquer has no such tendency. Compared to wall paints, lacquer is perhaps more expensive because of its thinner film and poorer "covering" power. A priming coat is always desirable when lacquer is to be used on walls. Whether this primer should be of an oil base material or a special lacquer type depends on the type of lacquer to be finally used. In any case the primer must harden thoroughly before the application of the finish.

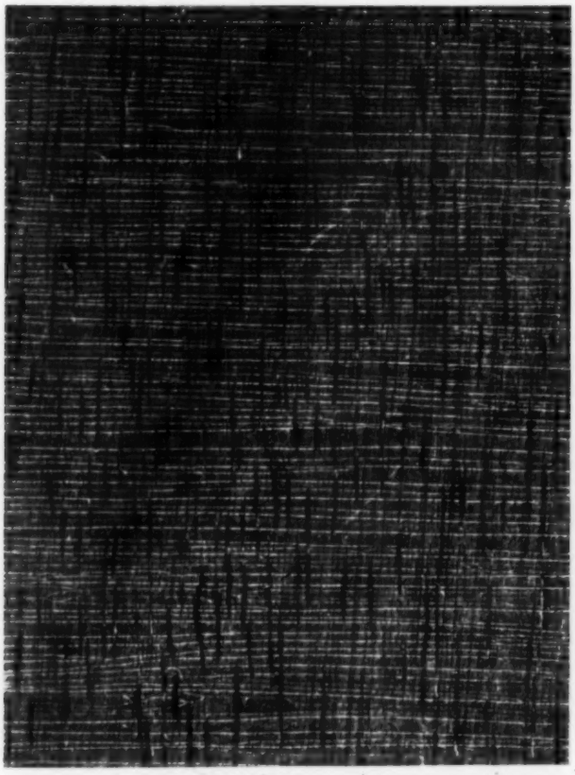
3. *Use of Lacquer on Metals.* Most architectural metalwork is primed at the factory before being set in place for the finishing in the building. The nature of the priming coat should be known before the correct lacquer can be specified for the finish. In any event, the surface must be clean. If lacquer is to be used on bare metal, it should be practically chemically clean to insure a good finish. If the metal is too smooth or polished there is a tendency of the lacquer to peel, due to its contracting nature and consequent lack of adhesion. It is often considered best to give metal surfaces a coat of a good oil base primer and to allow this to harden thoroughly before the lacquer is applied, especially if the lacquer is to be applied by a hand brush.

E. *Application of Lacquer Materials.* From a standpoint of application, lacquer is supplied in two forms,—brushing lacquer and spraying lacquer. Brushing lacquer can be applied either by hand or spray brush; spraying lacquer only by spray brush. The principal point of difference is a lack of latitude in formulation with brushing lacquer ingredients, and consequent limitations for some conditions to which a spraying lacquer may be solely adapted. It is necessary to incorporate more than double the amount of pigment in brushing lacquer than in spraying lacquer in order to secure proper "hiding" and "covering" power, and this is not always desirable. Spraying is the ideal method of applying lacquer, not only because of the speed, but because heavy protective coatings can be applied evenly. From a professional standpoint, the only reason for the use of brushing lacquer on large surfaces is the opposition of labor to the use of the spray. Brushing lacquers are more costly than spraying lacquers and often have to be formulated from the standpoint of expediency, in order to have them practical for application. Brushing lacquer must contain cotton solvents, and obviously these solvents will act on preceding coats. This fact necessitates a change in brushing methods by the painter.

Those who acquire the knack can get excellent results, and the speed of application possible reduces labor costs markedly. The successful application of a good brushing lacquer is a simple matter of spreading it on level and correcting any sags at once. Unlike oil-base materials, good brushing lacquer is self-leveling. Many of the failures with good brushing lacquer are due entirely to the mechanic who will insist on making slow and hard work out of what should be fast, easy work. He will brush out, and cross and back as he has always done with oil-base materials, and get into trouble through the softening of the under coats. When brushing lacquer is specified, the proficiency of the painter who is to use it should be determined. Even an excellent brushing lacquer can cause much trouble in the hands of an unintelligent mechanic.

F. *The Cost of Lacquer.* An arbitrary statement would be that material costs of lacquer are 25 per cent higher than oil-base materials. On the average, lacquer finishing requires at least twice as much lacquer as varnish to give the same "building." To offset this there are the possibilities of faster application, with either brushing or spraying lacquers, with resultant reduction of the high labor cost factor. Another important possible saving is in the time generally lost in rigging up for the painting in a room with drop cloths, etc., and the subsequent labor in removing them to another room, while the room already painted is drying. Using lacquer, a painter can often stay on the work until it is finished. There is also the sometimes appreciable expense for final touch-ups and clean-ups, made necessary by careless workmen marring or handling wet surfaces. Such defects can be speedily and effectively handled with lacquer, while often involving considerable labor with varnish and paint materials. The element of "time work" is another point. Bad weather may handicap the completion of varnishing and painting, whereas lacquers can be adjusted to meet the most severe conditions.

In Conclusion. The object of this article will have been attained if the architect has obtained a clearer understanding of pyroxylin lacquer, its composition, its advantages, and disadvantages, and some of the prerequisite conditions essential to its successful use. In every case when the use of lacquer is contemplated it is most advisable for the architect to consult the technical experts of the manufacturers and ascertain from their experience the proper use of the material in order that the conditions necessary for its success shall be fulfilled. It is best, if possible, to provide the manufacturer of the lacquer with a sample of the material to be lacquered so that he will know the exact conditions to be met. Success is insured by this method used by a large automobile concern which subjects samples to a 300 hour test under ultra-violet rays and alternate wetting and drying.



Cross Checks or Temperature Cracks
This is the most common failure, due to exposure to cold temperature The cracks are at right angles to the grain of the wood

Old Age or "Crow-foot" Cracks
This is a usual form of crack, due to the film losing its elasticity through age and the strain of wood shrinkage and expansion

STRUCTURAL STEEL FOR ORDINARY USE

BY
FRANK W. SKINNER

ONE of the most recent developments of the ordinary uses of steel is in connection with dwelling houses. During the past three years a considerable number of steel-framed dwellings have been constructed. Two types of frame have been developed, one similar in many respects to the ordinary stud and joist construction of wood, and the other with a skeleton frame analogous to that of a skyscraper. Some of these designs have been patented. Construction framing should follow the lines of simplicity and have a framing member only where a definite load is to be supported. This limitation is rapidly becoming recognized, and new designs of steel frames are becoming more simple and direct than their predecessors. The weight of steel involved is being reduced without affecting in any essential the necessary strength of the structure.

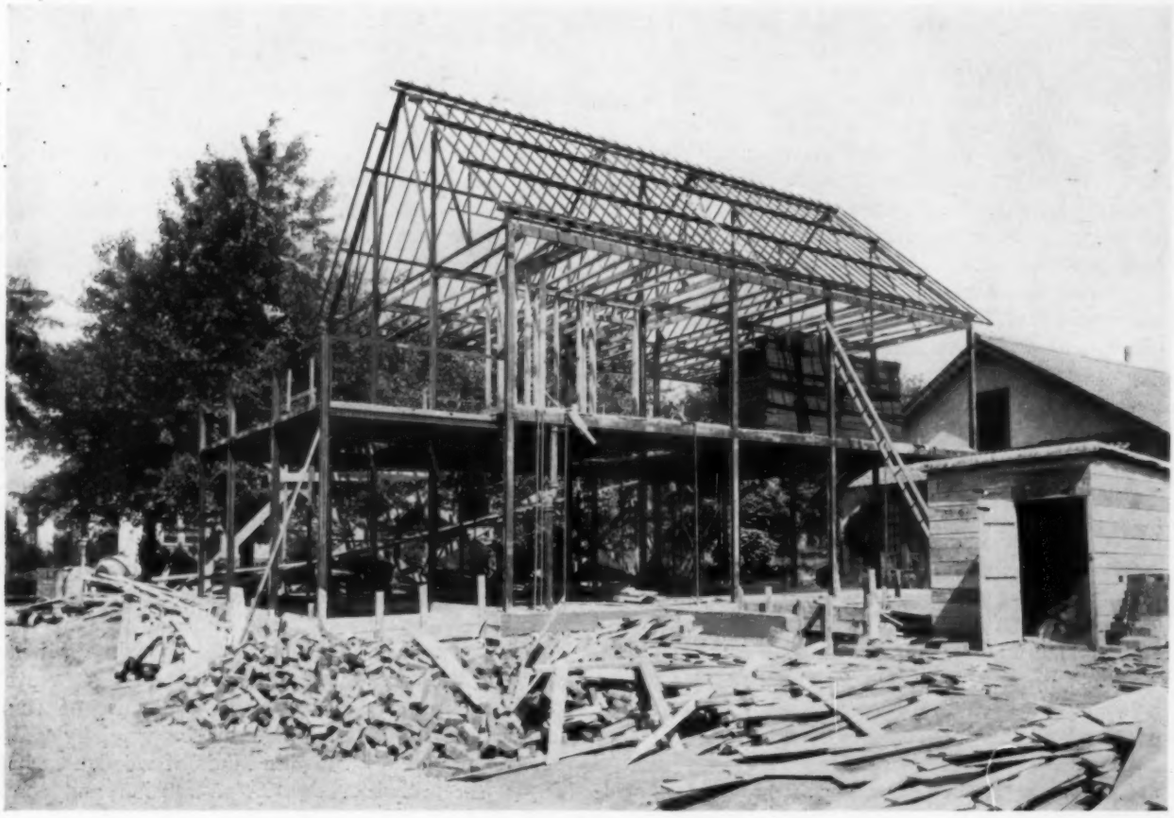
The greatest advantages of the dwelling house steel frame include the elimination of shrinking, warping, decaying, and sudden failure under excess loads. It is incombustible and adds nothing to the fire hazard. It must, however, be protected from temperatures exceeding 600° Fahr. and from moisture. Such a frame can be so designed by competent engineers as to resist cyclones and earthquakes. When combined with suitable floors, walls, roofs, stairs and partitions, it becomes an essential part of an incombustible house. The designing of the steel frame is properly the work of the structural engineer, and that of the floors, walls, roof and partitions is the work of the architect. That designs have not been uniformly satisfactory is no fault of the steel as such, but has often been because of a lack of proper coördination of the various parts. Some designers of these houses have given too much attention to the steelwork in devising a complicated scheme without giving sufficient attention to the other quite as important elements of the structure.

In this connection, it may be well to mention some communities built up of very costly, inflammable dwellings on which the owners cannot procure fire insurance. If brick houses have incombustible floors, partitions, roofs, stairs and interior doors, a fire could be confined to its place of origin without damage to the other rooms. This can be accomplished by the use of structural steel joists, girders, rafters and partition studs. Too little attention has been given to the use of steel for this purpose. The steel-framed designs so far made have been for medium-priced homes rather than for mansions. Steel is, however, appropriate for nearly all classes of dwellings, and its cost is not excessive compared with that of first grade materials which it displaces. Fire-resisting floor, partition and roof construction is procurable in a great many forms with which the architect is familiar. Because of competition between the producers of the various materials used, the cost of incombustible construction does not exceed that of any other first class construction. Much time and experimentation have been given to and money expended in developing steel-framed dwellings. They are a well demonstrated possibility, and the promise is that their use will increase rapidly.

Structural steel is one of the most important of the materials used in the construction industry, of which buildings constitute the major portion of the $6,000,000,000 annual cost. In fact, it was the making of structural steel as a commercial commodity that gave the construction industry an impetus that has not yet shown any signs of losing its force. Improvement in building materials and methods of construction shows no signs of abatement, and through it all structural steel holds its unique position of unlimited adaptability within the construction field. Steel has also maintained its place as the standard for comparison of structural materials for certain major uses, because of four characteristics: (1) It is the only commercially available material, except certain kinds of wood, that has large and reliable resistance to tension and compression stresses. It also has high resistance to flexure and sheer, thus providing unapproached universal strength of the greatest practical and economic value. (2) It has the greatest strength for a given measure of weight. (3) It has the greatest strength for a given volume. (4) Its quality is uniform. This cannot be said of other materials, and it is not to their discredit, since they all have certain characteristics that make them very valuable.

All structural materials have their natural limitations of strength and durability, and in selecting them these limitations should be considered. The safe strength limitations of structural steel are given in the various handbooks published by the manufacturers. These data are in the form of tables which are easily understood and are sufficient for ordinary use in connection with standard connection details and bearing plates. Intricacies of designing are found in skyscrapers, involving wind stresses and in specially loaded structures, which require the expert consideration of structural engineers. Other limitations of steel concern the property of durability.

Structural steel will corrode when exposed to moist air and water. To prevent corrosion, protective coatings of paint are applied, and these paints must have certain qualities to be effective. There are few if any protections for steel that are equal or superior to the best paints when they are adequately maintained, as many other coverings are absorptive and permit the access of water to the steel. It should be remembered that, except some granites and burnt clay products, all other struc-

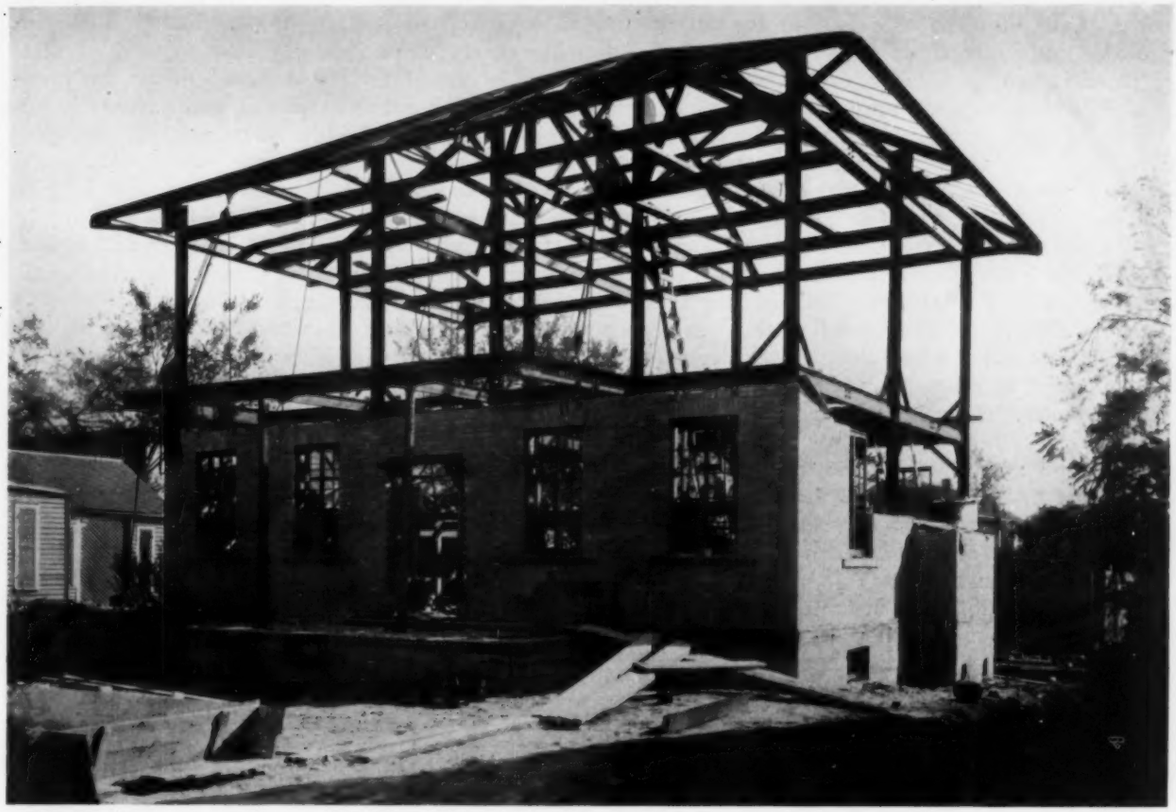


Steel Frame for Six-Room House, Port Washington, N. Y.
John England, Jr., Architect

tural materials suffer from the destructive attacks of water and oxygen, especially in combination with frost. Frost does not seriously affect properly designed steel. The strength of steel is affected by high temperatures. Steel is practically incombustible, but at temperatures exceeding 1000° Fahr. it loses its strength. In order to protect structural steel from the destructive effects of high temperatures, various protective encasements known as fireproofing have been invented. The use of these fireproofing coverings is regulated by building codes. No structural material, except certain burnt clay products, is immune from the action of high temperatures.

The adaptability of structural steel is practically unlimited. This is recognized in the design of important structures such as skyscrapers, commercial and industrial buildings, and bridges. Notwithstanding this knowledge, we are too likely to overlook the advantages of structural steel for ordinary uses. Structural steel can be adapted to a multitude of specific uses with the greatest facility. It is manufactured in the shape of I-beams, H-beams, channel beams, angles and other convenient shapes. Each of these shapes is made in a wide range of sizes and weights, providing for almost every strength requirement. When the strength limitation of any single action is exceeded, a compound shape is made by assembling and riveting simple sections and plates. Many of the standard shapes are suitable as manufactured for use as beams and girders without any special fabrication except very simple and inexpensive shopwork to make them ready for columns and other purposes. I-beams and H-beams are used as single pieces of any required length, available as rolled, with no shopwork, or with only minimum punching and riveting for connections. When the loads and dimensions are determined, these units may be selected safely, by inspection, from the tables, and can be easily erected by any intelligent builder with a derrick, bolts and wrenches.

For ordinary small building construction, field connections need not be riveted but can be securely bolted, insuring safe and rapid erection. Beams should be connected to other beams, girders or columns by bolts or rivets through standard connection angles attached to their webs, and generally they should not be seated on the top or bottom flanges of other beams or girders. Where they take bearing on or in walls, they should be seated on standard-size flat plates large enough to distribute their loads safely over the masonry. If the ends of the beams or girders rest on masonry walls, one or both ends should be anchored to them by vertical bolts passing through bearing plates or, as is more commonly done, with U-bar anchors. Columns carrying heavy loads should have special bearings distributing their loads over the masonry piers, usually by a set of short I-beams bolted together and embedded in concrete. Light columns, such as are composed of single H-beams or their equivalent, have angle



Steel Frame, House of Frank G. Clark, Baton Rouge, La.

flanges riveted to their lower ends and seated on loose thick plates accurately bedded at the proper elevations on the pier and connected to it with vertical anchor bolts passing through the angle flanges.

In selecting long beams and girders, great care should be taken that their deflection is not too great, irrespective of their actual strength. Too much deflection, even when there is no danger of failure, will crack the plaster and masonry, damage decorations and derange delicate machinery. It is also likely to increase existing vibration. Steel should be hoisted with rope-slings,—never with chains,—carefully adjusted so that they support the centers of gravity and cannot slip, or with hooks and clamps securely fixed in position; and it should be supported by them until at least half of all of the open holes in their field connections are filled with bolts, the remainder being put in and screwed tight as quickly as possible. After all connection bolts have been adjusted a second time to test their continued tightness, their nuts should be securely locked in place by cutting into the engaged threads with a pointed chisel. This secures them against accidental loosening, but they can be released by a powerful wrench without serious injury to the bolts. Care should be taken to have connection bolts of the correct lengths, so as to project from ⅛- to ½-inch beyond the tightened nuts to make them secure.

Steel columns must be kept perfectly plumb, and if there are spliced joints between column sections, they must have perfect bearings throughout. Until the entire framework is completely assembled and permanently bolted or riveted together, great care must be taken to keep it braced or guyed to prevent swaying or buckling and to make it all act together, so that no portion can fail alone. Beams and girders must have effective permanent lateral bracing. Planks, cement, bricks, tiles and other heavy material should never be stored on a floor supported by steel beams and girders until that portion of the floor and framework is entirely completed and all field connections fully bolted or riveted; even then care should be taken that the load does not exceed the capacity of the floor. Buildings before completion should be thoroughly X-braced or guyed against possible high winds, which have wrecked them before the walls, floors and roofs, which add greatly to their stability, were completed. During erection, derricks, hoisting engines and other heavy equipment should never be placed on steel beams or girders excepting under proper authority and inspection. Ropes and tackles should not be connected to the steel framework without permission. Special care must be taken to avoid improper connections of guy lines to members of the steel framework. It must be remembered that the safe strengths of the angle iron connections given in the handbooks are based on the use of rivets. Bolts are naturally less strong, as they do not fit as closely, and the load is not as likely to be evenly distributed on all of the

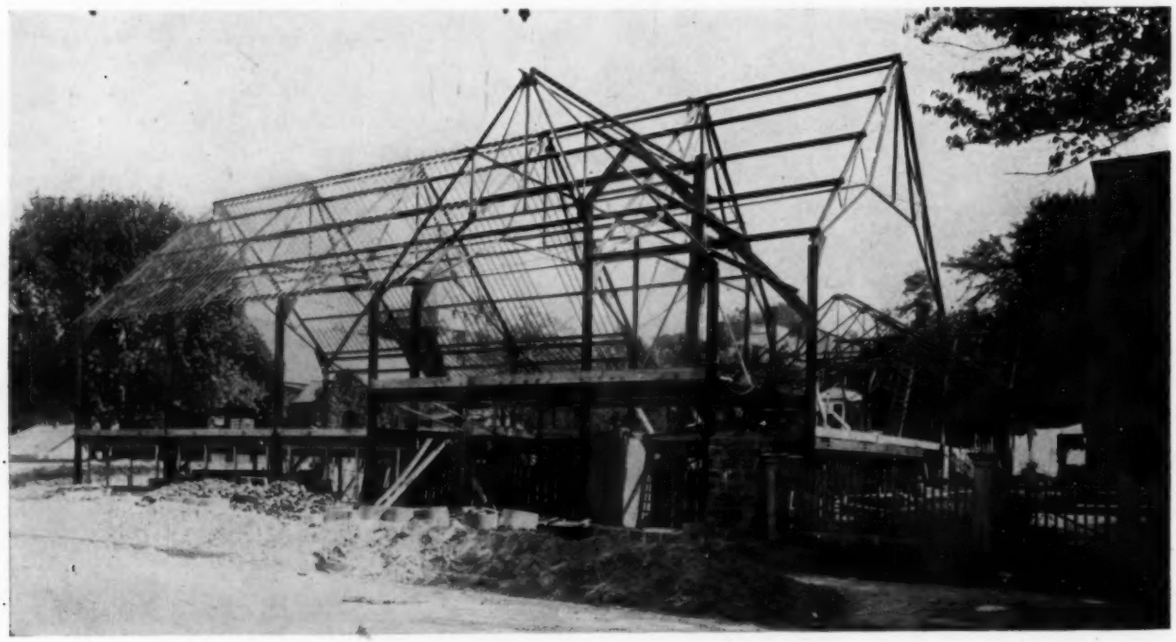
bolts. Care must be exercised in computing the probable loads to be supported by the steelwork, and if there is any probability that they may be exceeded, additional bolts must be provided. These are considerations in bolted steel construction.

Steel should not be accepted unless it is clean and free from rust. Steel enclosed in masonry or concrete should be thoroughly "parged," that is, covered with a thick coating of rich cement mortar, around which the mortar or concrete of the walls is well flushed as the masonry is built. If the brick or concrete encasement is exposed to the weather or water, the steel must be thoroughly protected by a non-oil paint, as concrete and bricks admit the passage of water. All concave, enclosed, or horizontal surfaces should be permanently drained, and all pockets and narrow clearances likely to collect or retain dirt or any form of moisture should be, if practical, filled solid with cement mortar, or otherwise frequently inspected, cleaned and repainted.

If any combustible material is used in construction or is stored or installed in buildings, the structural steel should be thoroughly fireproofed with a solid casing of concrete in contact with its surface and not enclosing an air space around the steel. If columns or other members are enclosed in brick, terra cotta or tile, the spaces between the steel and the casing should be filled solid with mortar. If the interior of the building does not contain combustible contents and is kept dry and warm, and if there is no smoke, steam, acid or liquid in contact with the steel, it may need no protection other than the ordinary ornamental painting. If the steel is likely to be exposed to smoke, acid fumes, cooking fumes, steam, drippings from wet ashes, or from brine or other sources of moisture, it should be accessible for observation, cleaning and protection, and in these cases it should not be enclosed permanently but should be thoroughly painted and frequently inspected. As long as the paint remains uninjured and effective, the steel will be in good condition. In all cases the design and maintenance must be such that steel can be kept clean and dry and not corrode.

Great improvements in steel making and in rolling mill practice have now made it possible to obtain standard I-beam and H-beam sections with depths of from 3 to 30 inches, flange widths of from 2⅓ to 16 inches, and weights of from 6 to 300 pounds per linear foot, thus making very desirable one-piece sections for columns, beams, girders, purlins, and lintels for all but extremely heavy service. They can be rolled of almost any length and can be shipped in carload lengths up to 60 feet, or more in special cases. Special I-beams with thin webs and flanges are now available for very light roof and floor construction. For one-story lengths, where loads can be applied directly on top, steel pipes are frequently very satisfactory and economical as columns, and should have faced ends and caps or screwed top and bottom bearing flanges.

There are several excellent types of patented steel roofs, floors and ceilings, the details of which have been carefully worked out, that can be commercially obtained. There are also several firms that manufacture standard, interchangeable framework for steel buildings that can be quickly delivered and erected. They are useful chiefly for industrial shops and warehouses, or for garages and the like. Steel windows, doors, frames and sash are also available, and their use is desirable.



Steel Work, St. Stephen's Church, Port Washington, N. Y.
John England, Jr., Architect

PRINCIPLES OF ECONOMICAL PLUMBING LAYOUTS

BY

MILFORD B. SQUIRE

OF THE OFFICE OF McKIM, MEAD & WHITE

IN using the word "economical" in the title, we may consider its meaning from two conflicting points of view. We may mean in one instance economy in first cost and in another instance economy of maintenance. It is usual to find that the materials which would reduce the first cost are those which have the shortest life and which increase maintenance and repair costs, even to the extent of making necessary extensive replacements. There is an adage, "the best is always the cheapest," to which I heartily subscribe. On the other hand, "moderation in everything," is equally applicable. It would be obviously unwise to specify the best and most lasting materials for a temporary structure, but it seems to me no less wise to specify materials the life of which is known to be less than the expected life of the building. If this latter course is pursued, it will be found that the replacement costs, especially labor costs, will considerably exceed that of a first class installation at the beginning.

In striving for economy in the plumbing expense of a project there is often a temptation to choose a cheap contractor. While such a choice may result in lowering installation cost, it often has the effect of raising the maintenance, repair and replacement costs. Eternal vigilance on the part of the architect in supervision is the price he must pay for selecting the so-called "cheap" contractor. The plumbing is often concealed as quickly as possible under these circumstances, and the quality of both the material and of the workmanship must be carefully watched. There is a natural and very human tendency on the part of the contractor to save himself expense in order to increase his profit, and this may work to the detriment of the quality of his work. It is well to be suspicious of a bid from a plumbing contractor that is much lower than that of others bidding on this work. It is probable that he has made a mistake in estimating, or that he has discovered loopholes or loose phraseology in the specifications, of which he intends to take every advantage. It seems that there is greater economy in the long run when only a few plumbing contractors, whose reliability and integrity are assured, are allowed to bid on the work. It must be remembered that in most instances "you get what you pay for," and that you cannot expect high class work at a cheap price. "One cannot make a silk purse of a sow's ear," and no matter how willing the plumbing contractor may be to live up to his contract, he cannot produce good work unless he uses good materials and employs skilled men in making the installation.

There are two factors to be considered in planning the plumbing layout to make it economical. The first factor is that of simple, direct arrangement of pipes and fixtures so that the smallest possible amount of material will be required to function properly. The second is that of the proper choice of materials to obviate the necessity of repairs and replacement, to say nothing of the annoyance and dissatisfaction caused by a plumbing system out of order. It is often possible to so plan the plumbing system using the best materials that there will be no greater initial cost to the owner than for a poorly planned system using the cheapest material. The saving in the quantity of material by proper planning will often make up the difference in cost over an improperly designed system using low quality materials. The architect's problem is therefore more one of economy in length of pipe and simplicity in arrangement than one of choosing the material of lowest first cost. The latter procedure will in almost every instance make the plumbing system expensive rather than economical in the long run.

It has been the practice in many offices to indicate the locations of fixtures on the plans without due regard for economy of installation costs. In many instances the plan indications have not been accompanied by plumbing sections or diagrams, and the plumbing contractor has been left to his own devices in installing the system,—and the devices are many and devious, as architects and their clients have learned to their sorrow. The disregard of structural requirements on the part of some plumbing mechanics must be seen to be appreciated. If the architect took the time to make a plumbing section of the proposed installation of fixtures as indicated on his plans, the deficiency or efficiency of the arrangement would be quickly and clearly demonstrated. It is probable that changes could be made in the locations of fixtures that would reduce the amount of pipe required. In this connection it is always wise to employ an expert as consultant if expert engineering services are not available in the architect's own office. In many instances the savings made in following the rearrangements suggested by the consulting engineer have more than paid for his service as well as produced a salutary effect on the client by giving him a more efficient plumbing installation. A plumbing layout or a plumbing section should form a necessary part of every set of working drawings emanating from an architect's office. The care with which this plumbing layout is made, and the intelligence and knowledge used in its making, determine the economy of the installation. Even in small house work, the best price can be obtained from plumbing contractors by including a plumbing section so that each bidder will know exactly what will be required of him, to say nothing of having a more definite assurance that

the plumbing installation will be really efficient.

It is my object to point out in this article several economies possible in planning plumbing systems. The first principle of economy in planning a plumbing layout is that of simplicity. Naturally, the simpler the system the fewer the parts to get out of order, the greater the ease of installation, and the greater the accessibility for repair or cleaning should the necessity arise. Simplicity can be attained in the plumbing system only by making an accurate plumbing section and revising it to eliminate every joint and offset possible. Directness may be considered a corollary of simplicity. By an analysis of the plumbing section, all unnecessary turns and changes in direction of the pipes can be eliminated. The architect must realize that each joint in the plumbing section means a corresponding amount of labor cost,—the labor of cutting the pipe, the labor of installing the pipe,—and the cost of making the joints,— as well as the cost of the necessary fittings.

It is necessary in designing an economical plumbing system to make all horizontal runs as short as possible. This not only decreases the cost but actually makes the system more efficient. It has been found best to locate water closets close to soil-stacks and if possible to group the other fixtures near them. The fixtures should be so located as to obviate the possibility of their freezing. As a rule this can be done by making sure that no plumbing lines are run in the outside walls or outside ceilings where they will be exposed to large temperature changes. If it is absolutely necessary that they be in such places, it is poor economy to try to save a few dollars by omitting insulating covering from the pipes. The head of the tub and the lavatory should be close together, and both of these near the water risers and the stack, otherwise there is a needless amount of piping. This can easily be accomplished by thoughtful planning. The United States Department of Commerce Bureau of Standards has carried on an extensive investigation of the possibilities of improving the plumbing systems of small dwellings and has published the results in a booklet called "Recommended Minimum Requirements for Plumbing in Dwellings and Similar Buildings," which may be obtained for 35 cents from the Superintendent of Documents, Government Printing Office, Washington. The investigation was conducted by making actual installations of plumbing fixtures, using various systems and various arrangements. In this way very real and practical results were obtained. The results of these tests indicate very strongly that these features, among others, are essential to an efficient, economical plumbing system:

1. Simplicity of design.
2. Grouping fixtures about the stack.
3. Short horizontal runs.
4. The provision of adequate water supply.
5. The provision of proper back-venting.

To the architect in search of concrete examples of efficient and economical arrangements of fixtures and pipes, this booklet gives diagrams and instructive explanations. Some of the diagrams are not as well drawn as might be desired, but the architect will find in them very definite arrangements, and illustrations embodying the correct principles of economical plumbing. It must be borne in mind that in every case the local plumbing code or ordinance must be consulted to make sure that it is not violated by a plumbing layout derived from this source. Many such codes are not based on scientific investigation or the best current practice, but they must be complied with, nevertheless. One code may prohibit the main house-trap because of its system of sewage, and the code of another locality may make the inclusion of the house-trap mandatory. For the sake of economy it is best to consult the local code to make sure that the plumbing system will not have to be altered later, at considerable expense, to make it conform to the local building law.

The choice of materials naturally plays a most important part in the initial cost of the installation. In every case the pipe materials must be chosen with due regard for the chemical content of the local water supply. Some water has little effect on piping, and the cheapest materials may last for the entire life of the building. On the other hand, where chemicals are used in purifying the water or where there is a large natural destructive chemical content, the most non-corrosive metals should be used. The comparative prices of pipes of various materials form an important consideration. Genuine wrought iron pipe costs approximately twice as much as steel pipe, but may be also about twice as lasting, depending on its use and the water it carries. Brass pipe of good quality costs almost twice as much as genuine wrought iron, but it lasts practically indefinitely with average use. Brass pipe made of 85 per cent copper and 15 per cent zinc costs about four times as much as galvanized steel. Usually the horizontal runs of the hot water supply system are the first to cause trouble due to deterioration. For this reason it is advisable to use pipe of the best material as hot water pipes. It is important that the fixtures used with brass pipe be of a kind that will not be conducive to electrolysis, which may cause comparatively rapid disintegration.

In selecting the material for the various pipes it should not be assumed that because one material may cost only half as much as another the installation cost will be half. The cost of installation in an ordinary dwelling may be divided approximately:

1. Cost of pipe and fittings, 30 per cent.
2. Cost of fixtures, 35 per cent.
3. Cost of labor, 35 per cent.

In large work the percentages of cost run about:

1. Cost of pipe and fittings, 26 per cent.
2. Accessories (pumps, tanks, etc.), 11 per cent.
3. Fixtures, 26 per cent.
4. Labor, 37 per cent.

It is relatively easy to find a place for the water supply piping in the average house, because of the

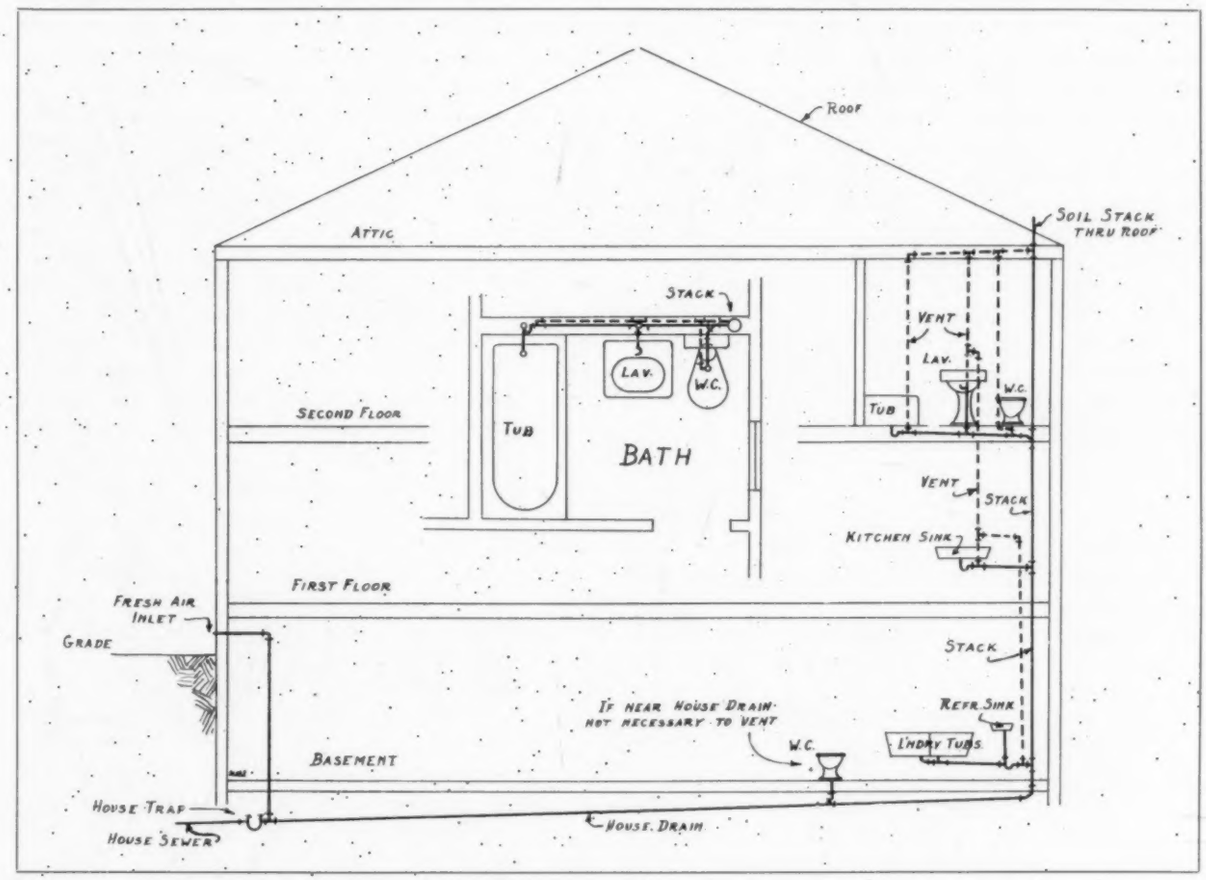
small sizes of the pipes. It should not be installed in an outside wall unless absolutely necessary, and then only when thoroughly frost-proofed. In many cases it is possible to change the location of fixtures to avoid this or to make the connection to the fixtures up through the floor. Water piping should be installed so that it will drain from a few points, preferably one. This is a convenience to the house owner and also a protection, in that he can drain the piping so that it will not freeze and cause damage in case of a lack of heat in the house. It is a convenience, but not a necessity, to install a hot water circulating pipe making the system "circulating"; that is, a continuous pipe in which the water circulates from the hot water heater or tank to all fixtures and back to the heater. This will allow hot water to flow from the hot water faucet immediately instead of having to wait a half-minute or so after the water is turned on. The extra expense of this pipe is small, as it runs alongside of the other water piping. If this is installed, the hot water piping throughout should be covered with insulation, as the heat loss from an uncovered pipe would mean a considerable operating expense. Where economy is the primary consideration, the "circulating" hot water system should not be specified, as it is more expensive in both first cost and maintenance.

Materials. In specifying pipes of various materials it is well to keep in mind several points in addition to those which have already been mentioned.

Cast iron pipe is practically indestructible as far as wearing qualities are concerned. It is therefore used for soil, waste and vent lines. It is absolutely essential that it be used underground inside of the building walls, as it is practically always gas-tight.

Glazed tile pipe does not corrode and is satisfactory to use outside of the house for the house-sewer when there are no trees near it. It is the least expensive of all pipe materials. Tree roots in seeking moisture often find their way through the joints in the pipe or cracks in the tile, and once inside they grow and may finally clog the pipe entirely. The pipe then must be dug up, cleaned out and relaid, or new pipe put in. At additional expense the house sewer can be made of another material where there are trees, and thus avoid this trouble.

Steel pipe, galvanized, is universally used throughout plumbing systems. Its life under adverse conditions may be shorter than pipe of other materials. Steel pipe is used extensively in tall buildings because of comparatively light weight and since, as with any pipe with a threaded joint, expansion joints are easily taken care of. It is used largely because of its low price also. Copper-bearing steel pipe is



Plumbing Diagram for Suburban House

Note: Sizes of all pipes should be indicated on diagram for contractors

better than the ordinary and is much used because it approaches wrought iron in wearing quality and is cheaper than genuine wrought iron. Where the chemical content of the water is favorable, steel pipe has a very long life. In Schenectady, N. Y., for instance, they use steel pipe almost entirely, and its life seems to be as long as that of any other kind of pipe.

Galvanized wrought iron is used for waste and vent connections. It is also used for water piping to a great extent. In the vicinity of New York galvanized wrought iron is used to a greater extent in the plumbing in small houses than any other pipe, although brass pipe for hot water is being installed in the better grade of houses. Galvanized wrought iron is considered under ordinary circumstances very satisfactory for cold water in this section of the country.

Brass pipe is used extensively on hot water, and in the better class, more elaborate houses, on cold water. It is well to use brass pipe when possible for the hot water, as it does not corrode or produce rusty water after a few years as iron and steel pipes are likely to do. Brass pipe costs more than iron or steel, but the length of time it serves before repairs are necessary probably compensates for the difference in cost.

Copper. In some localities, such as Pittsburgh, the water is so corrosive that it is practically necessary to use copper pipe if length of service is a consideration. Naturally the cost of this installation is too great for an average house, but it is certainly worth the money invested in localities where the water supply is of this nature.

Lead water piping was used extensively until cities and towns started to treat water with chemicals. These chemicals have had a very bad effect on the lead, and as lead is expensive in the finished work compared with other materials, it is not used so extensively. Lead has advantages in that a good plumber can tap the piping for new connections without much trouble in case alterations are to be made.

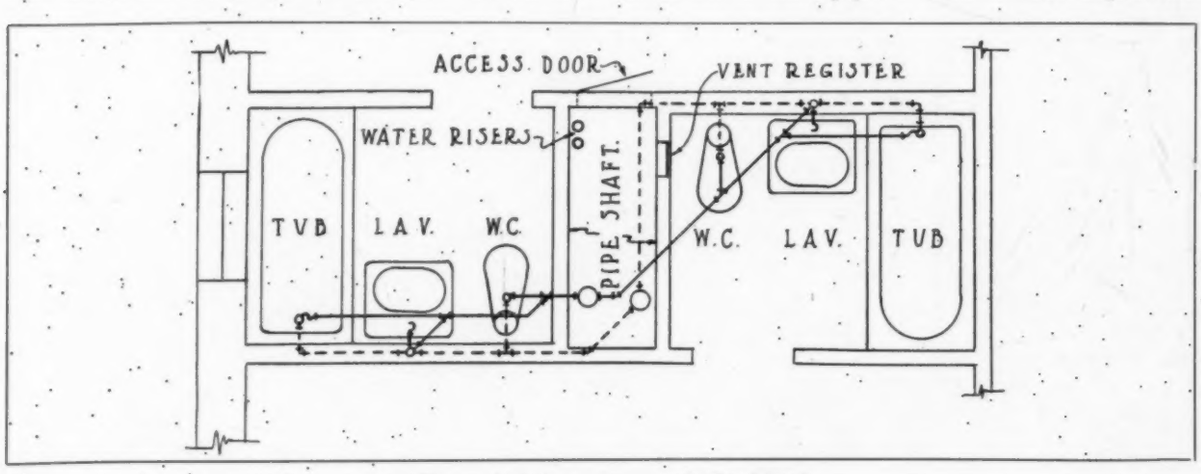
Fixtures are usually selected by the owner, and like other things the price has an enormous range. There are certain features on which the architect can advise the owner in his selection. There are several points that must be kept in mind in choosing the types of traps for various purposes. The ordinary "P" or "S" trap should be used for lavatories, sinks and tubs, both bath and laundry. The "drum" traps have the advantages of being easily but not thoroughly cleaned out and being readily accessible, but their great disadvantages are their liability to stoppage due to the permanent interior portion and the possibility of gas leakage through the clean-out. Their use is prohibited in many cities,—New York for instance. The use of "non-syphoning" traps to eliminate the necessity of back-venting is questionable. The so-called "non-syphoning" traps may be objectionable because they may syphon out, be noisy, gurgle, and because they do not allow proper ventilation of the system. The cost of the "non-syphoning" traps is greater than the cost of the ordinary "S" trap or "P" trap. It will be found that a great number of building departments do not allow the use of all types of "non-syphoning" traps. It is my opinion that the simple system of back-venting gives a more satisfactory and efficient result than a system in which the venting is taken care of only by the soil-stack itself, except in the case of very small work.

In designing a large installation, such as that for a hospital or office building, it is essential to have the advice or services of an expert to insure economy as well as efficiency. In the preliminary planning of the building the sketch plans should be carefully checked to see that these several conditions are met:

1. That the stacks should run from basement to roof in as straight a vertical line as possible. This can be accomplished by a vertical pipe shaft in which all the stacks are placed. Doors should be provided to this pipe shaft in which all the stacks are run. Doors should be provided to this pipe shaft on each floor.

2. Where possible, bathrooms should be located on each side of the stack rather than on one side only.

3. The proper planning and placing of the fixtures in each bath should be such that short lengths of pipe will be used. This page shows a plan for hotel baths. It will be noted that the length of run of horizontal soil or waste pipes is about as short as possible.



An Economical Arrangement of Hotel Baths

BUSINESS AND FINANCE

ARCHITECTURAL SERVICE FROM THE BUSINESS POINT OF VIEW

BY

C. STANLEY TAYLOR

THE introduction of this new Engineering and Business Section of THE ARCHITECTURAL FORUM forms a definite recognition of fundamental changes which have taken place in the practice of architecture. It is a forecast of a time rapidly approaching when the architect will assume an unusually powerful position in the economic scheme of this country. It is quite apparent that with the passing of the next few years, architectural offices, large and small, will be rendering for their clients a vastly enlarged service, which will include in far greater degree than ever before the protection of the clients' investments. In fact, if the signs of the day are read correctly, many architects will go much further. They will direct the attention of clients to logical investments in the building field and actually promote new projects, even as a few have already done with no sacrifice of ethics or loss of good standing.

Architects must learn to work more closely with other advisory experts who influence the investment and the administration of the building dollar. The interests and functions of the banker, building manager and real estate broker are becoming more closely coördinated with those of the architect. When institutional or educational buildings are to be designed, the architect will more frankly seek the advice of those experienced in such administration. The importance of insurance rating bureaus and building code experts will be more clearly understood; the opinions and demands of loaning institutions will be more definitely determined before the planning of new buildings is undertaken. In other words, it is quite probable that for every new building, before the designer's pencil touches paper, there will be established a functional plan. This functional plan will be an exact determination of space requirements carried out in detailed space units. Paralleling this functional plan there will be the preliminary financing and operating schedule necessary to create the investment and insure its soundness. Only when both of these controlling schedules have been established and declared sound by those who will manage the structure or operate the business within it, will the architect begin the correlating of the space units within the perimeter of the building.

It is true that this broadening of architectural service is a radical departure from practice in some offices; but in line with all modern professional service, the requirements of clients are changing. Building investments are being analyzed and administered today in a manner very different from that of but a few years ago. The high cost of modern building construction and the complexity of structures are both acting to enforce this condition. It has become recognized that the original plan and the established maintenance costs of buildings like hotels can absolutely insure success or destroy investment values by so loading the projects with unnecessary overhead costs or restricted incomes that they cannot possibly operate profitably. Experienced accountants will testify that many business failures have been primarily due to improper planning and unwise building specifications. Of course, the architect might take the attitude that this is none of his business, and that his function is to plan the building exactly in accordance with the wishes of his client; but it is obvious that the value of his service is tremendously increased when it takes on the function of protecting the investment made by his client.

When we review the waste of the past,—when we note in thousands of existing buildings not only great waste of space but the setting up of high overhead costs and often rapid depreciation,—it becomes apparent that someone must give greater thought to this economic side of building production. It may be unfair to directly charge the architectural profession with the responsibility of creating inefficient space arrangements and the inadequacy of specifications; it may well be that the architect has carried out his instructions, which have often included the sacrifice of quality in order to meet the investment limitation. On the other hand, it is common experience, when a building is unsuccessful, to hear the owner charge the architect with its failure.

Regardless of where the blame may lie, the facts are ever-present, testified to by real estate managers, mortgage companies and the business world in general. Other factors of this field, such as building managers, mortgage bond houses and large mortgage companies, have already taken the lead in the improvement of plans and specifications. Today, the architect faces the problem of being a leader in this field or of carrying out instructions which to a greater and greater degree will come to him through his clients. Far better it will be if the architect can be a leader in eliminating waste and in insuring the success of building investments. This does not mean that he must be "all things to all men," but it does mean that he must have a much broader understanding of the various problems which are involved with every building operation, even those of a residential type. It means that he should recognize the value of consulting service for problems which lie outside the scope of his own function but well within the scope of his understanding and appreciation.

Perhaps the most interesting manner in which to

present forceful proof of this contention will be to consider briefly the economic needs of building projects of various established types and to indicate how certain architects have actually been of great assistance to owners. Accompanying this article is a chart which is quite elemental in its nature, but which serves to suggest logical relationships for the architect in connection with various types of buildings. Considering these various building types in the order in which they are presented, we find that the architect who is carrying out an office building project should establish relations with the financing institution or individual who is providing the building loan and permanent mortgage. Perhaps his first contact will be in the development of the sketch plans which the owner wishes to present with his mortgage application. If the architect is brought into such interviews, he can contribute materially by explaining details of the proposed plan and specifications, and in many instances this means a considerable difference in the amount of financing which the owner may obtain. Before proceeding beyond the sketch plan stage, the building manager should be appointed, and the architect should work closely with him to gain the greatest efficiency of space under the local rental market conditions. He should work with the building manager on the matter of specifications, particularly as to mechanical equipment, finished surfaces, etc., which contribute their quota of overhead and maintenance cost. If the project is large, special consultants may be required for elevators, service areas and other special parts of the building. The insurance engineer is of importance, because if the plans are examined under the local fire underwriter's code, it will be found in almost every case that suggestions can be made which will reduce insurance rates and fire hazards.

The tabulation shows various suggested contacts of this nature for other types of buildings which cannot be analyzed in detail here. It is interesting to note, however, that even in the field of small dwellings this business viewpoint has its direct and important application. Certainly it becomes more important as the size of the dwelling investment increases. There is, of course, the contact with the bank, building loan association, or other source of mortgage money. The architect can prepare for the owner preliminary plans and specifications which will actually help him to get as much as 25 per cent more in the way of a mortgage loan than the owner could probably obtain through a general application.

The owner can be advised to avoid eccentricities in plan or general design which would tend to decrease the ultimate sales value and sales market for the property. Convincing proof of this suggestion may be found by visiting any real estate auction sale where suburban houses and country estates are offered on the auctioneer's block. Time after time it will be seen that attractive but conservatively designed houses bring much higher prices than those which are exceedingly unusual in character or wasteful in plan. It is true that the owner who is putting up the money is justified in having what he wants in the way of a house. He may consider it as he would any other luxury, but the rapid changes in business conditions today indicate that sooner or later every house will have to meet the test of appraisal value and of salability. It may be that the owner will wish to dispose of the house in order to build one larger; it may be that unexpected business reverses will force its disposal; it may be that the house will become an important part of his ultimate estate. In any event, it will be offered for sale some time, and if the architect can recommend a degree of conservatism and efficiency in the plan, such service will surely be appreciated and never resented.

In his contacts with the advisers and specialists referred to in the accompanying tabulation, the architect will gain much more benefit than merely the interpretation or solution of a particular problem. Frequent contact with men whose work has a bearing upon the architect's problems must necessarily broaden his own point of view and gradually equip him to render an increasingly valuable economic service to his client. A broad knowledge of banking, building management, insurance engineering, real estate values, and the more highly specialized fields served by various consultants is of particular importance to the architect who is working on large scale operations, but it is none the less desirable and valuable to the architect who purposely confines himself to a limited field or to small buildings. Through contact with successful bankers, the architect will soon acquire a general knowledge of the sort of loans banks desire to make; of the limits that are imposed upon banks by law as to the ratio which the loans may bear to the total investment; and something of the rates and discounts prevailing on loans of various types from time to time. The architect will learn how applications for loans are prepared and how the banker analyzes and examines them with a view to determining the desirability of the loans applied for; and through this knowledge he will be equipped to advise his client intelligently with respect to the data required to assure success in a loan application. Through the banker may also be obtained a valuable knowledge of how to set up a complete financial program covering the investment, fixed charges, operating expenses, and income. To be sure, the banker may not know how many of these elements are actually developed,—that, in fact, is within the province of other specialists in many cases,—but at least he will know how these facts must be presented and how they must relate to one another in order that the proposed project may be assured of financial success for its promoters.

Architects often overlook,—or purposely avoid through lack of sufficient knowledge of how to carry on the work,—opportunities for the promotion of building enterprises, particularly those which require the organization of some form of syndicate to provide the equity financing. Here again the archi-

SCHEDULE OF PROFESSIONAL AND ADVISORY RELATIONSHIPS

FOR THE BUSINESS ADMINISTRATION OF ARCHITECTURAL PROJECTS

In this chart are indicated the sources through which the architect should obtain outside counsel during the development of various types of building projects in order that he may render a more complete and satisfactory service to his clients, with particular reference to the economic aspects of his buildings.

A indicates coöperation mandatory. *B* indicates coöperation advisable.

Type of Building Project	[1] BANKER	[2] BUILDING MANAGER	[3] SPECIAL CONSULTANTS	[4] INSURANCE ENGINEER	[5] REALTOR
OFFICE BUILDINGS	*A.* For senior financing; checking layout and specifications	*A.* Checking plans for income and operating economies	*B.* For maximum rentable space, elevators, service areas	*A.* To obtain lowest fire and liability rates	*A.* For space demand and most salable features
APARTMENTS	*A.* For senior financing; checking layout and revenue	*B.* Checking plans for service and maintenance features		*A.* To obtain lowest fire and liability rates	*A.* For space demand, size and number of rooms, renting features
HOTELS	*A.* For senior financing; checking costs and revenue	*A.* Checking plans and equipment with hotel manager	*A.* Service features, room sizes and layout	*A.* To obtain lowest fire and liability rates	*A.* For subrental demand and income
DWELLINGS	*B.* For mortgage or building loans			*B.* For rates on large dwellings	*B.* For sale value, local demand
INDUSTRIAL	*B.* Occasionally for first mortgage or temporary loans		*A.* For process layouts, material handling, etc.	*A.* To obtain lowest fire and liability rates	*B.* Occasionally for housing facilities, etc.
HOSPITALS		*A.* Checking plans, etc., with managing directors	*A.* For correct layout and equipment	*B.* To obtain favorable insurance rates	
INSTITUTIONS		*A.* Checking plans, etc., with managing directors	*A.* For correct layout, special equipment	*B.* To obtain favorable insurance rates	
SCHOOLS		*A.* Checking plans, etc., with managing directors	*B.* For special features, mechanical equipment	*B.* To obtain favorable insurance rates	
BANKS		*B.* For service and maintenance features.	*A.* For vault design, banking equipment; protective systems	*A.* To obtain lowest fire, hold-up, robbery, and liability rates	*B.* For rental features when rental space is included
PUBLIC BUILDINGS		*B.* For service and maintenance features.	*B.* For special features; mechanical equipment	*A.* To obtain favorable insurance rates	
CLUB AND FRATERNAL	*B.* Occasionally for mortgages and temporary loans	*A.* For service and maintenance features.	*B.* For mechanical equipment, swimming pools, etc.	*A.* To obtain favorable insurance rates	
RELIGIOUS				*B.* To obtain favorable insurance rates	
STORES AND SHOWROOMS	*A.* Senior financing; checking revenue	*A.* For service and maintenance features.	*B.* For show cases, escalators, elevators, etc.; mechanical equipment	*A.* To obtain lowest fire and liability rates	*B.* For rental values, traffic courts, space demand

[1] BANKER: This refers to the source of mortgage funds, including mortgage bond houses and investment companies

[2] BUILDING MANAGER: Includes the professional building managers of office buildings and the managing directors or other persons in charge of the operation of institutional buildings

[3] SPECIAL CONSULTANTS: Includes all special consultants and advisers specializing in various types of buildings or equipment

[4] INSURANCE ENGINEER: This refers to the trained experts available through insurance companies for checking buildings with respect to insurance requirements

[5] REALTOR: This connotes the experienced local real estate broker or agent

tect's contact with bankers will put him in a position to find out from experienced men not only how these things are done, but where he may go to find individuals who might be interested.

The building manager is another mine of information to the architect. From him there can be acquired a general knowledge of the service requirements of various types of buildings; of the proper use of various materials and equipment items, particularly with respect to their cost of maintenance and operation, and of the means of developing proper space efficiency. The building manager is concerned with the problem of selling or leasing the space which the architect designs. Naturally, he must acquire a practical knowledge of what is salable or rentable, and this knowledge should be a part of the architect's own equipment. But the manager goes further than that. He must operate the building, and he soon acquires a very sound knowledge of the relative values of wall finishes, types of floors, types of heating systems, elevators, and all manner of other appurtenances for office buildings, apartments, hotels and other structures which come under his hand. Through friendly contact with successful building managers, the architect may acquire much practical knowledge which will improve his own work and increase his value as an adviser to his clients. Likewise, the various special consultants, to whom the architect should go upon occasion for the solution of specific problems in connection with a building type of unusual character, have much information of a general character which the architect should add to enlarge his own mental equipment.

An examination of the accompanying chart will show that the insurance engineer is an adviser who should be consulted by the architect on practically every type of building operation. Only in the case of dwellings is the insurance engineer's contact omitted from the tabulation, and even here there are occasions when insurance requirements should be taken into consideration by the designer, especially when large and costly dwellings have been commissioned, or where garages are incorporated in the houses. The services of insurance engineers are offered without cost to the architect or owner by the great insurance companies of the country which maintain staffs of specialists trained to understand and interpret insurance ratings in terms of building design and materials. The architect may submit without charge his preliminary studies to the insurance companies and have them advise him of the probable insurance rate that would be applied to the building upon completion. They will also freely indicate what things could be done to so reduce hazards in the building as to result in a markedly lower insurance premium. Very often the insurance engineer's recommendations can be adopted without additional cost to the owner and thereby save an annual charge which in time might substantially reduce profits. These engineers are practical men in most instances, and frequent contact with them will soon give the architect a sufficient working knowledge of insurance companies and rating bureaus to enable him to plan his buildings in the first place in accordance with modern recommended practice, and to advise his own client when a building is first proposed what he should do to secure the best rates.

Of course, the realtor has much information of value to the practicing architect who is frequently engaged on buildings of an investment or speculative nature. The practicing real estate broker is a source of much information regarding land values and their prevailing trends, rental demand in various sections, the prices paid for space, and the salability of buildings of all types. The architect who has a sound basic knowledge of these matters can talk to his investor-client in his own language and show an appreciation of the investor's problem that would be most convincing evidence of the architect's capacity to design a building which will serve the intended purpose and assure maximum return.

Thus it is that architects gain a two-fold advantage in maintaining broad contacts with other representatives of the business world. For the sake of their clients' interests, they should maintain these contacts so that individual operations may be developed under the guidance of men whose work enables them to direct various aspects of a building project toward a successful conclusion; and for his own sake, the architect should continue to maintain these contacts that he may increase his capacity to serve.

The statement is often made that architects are not well paid for their work, and except for very well established organizations, this statement is generally true. Accepting the fact, let us seek the reasons, of which there are two. In the first place, so much of the architect's work is carried out behind his own walls and so few of the vast number of details are understood or appreciated by the client, that his work does not seem difficult or complicated, and his compensation appears to the client to be ample, even though it may be very small. The second fact is that the architect is frequently not taken seriously from a business viewpoint. He is not expected to have the degree of common sense that is required when a lawyer is retained or when a physician is called in. Let this condition be once cured,—let the client develop respect for the architect's desire and ability to protect his investment,—and the whole matter assumes a different aspect. Proper fees will be paid willingly and promptly, and the architect will gain his rightful place and business relationship.

The best way for an architect to gain at least a reasonable degree of knowledge pertaining to the business aspects of a building project is through an interchange of experience and facts relative to its economic problems. With this thought in mind, it is planned that this department of THE ARCHITECTURAL FORUM will be given over to a presentation of extremely practical information, including very little theory and consisting for the most part of facts gathered from experience of architects and business men.

PRESENT STATUS OF COÖPERATIVE APARTMENT PROMOTION AND FINANCE

BY

LOUIS G. KIBBE

ASSISTANT MANAGER, COÖPERATIVE SALES DIVISION, DOUGLAS L. ELLIMAN & CO., INC.

WHILE statistics are not always wholly reliable, they do serve to chart definite trends, and the data given here are presented to reflect the growth and development of coöperative housing in the east side residential section of New York during the seven-year period from 1922 to 1928 inclusive. No attempt has been made to compile statistics for the period prior to 1922, nor statistics for the entire city.

Since the stock of a coöperative apartment corporation is based upon the equity (the difference between the mortgage and the total sales price), it is common practice in this city to speak in terms of equity values. However, in determining a true comparison, the over-all values should be considered in a study of these tables. It is interesting to note the constant growth in the number of projects in the east side residential area from three in 1922 to 17 projected for completion in 1928, with corresponding over-all values of $3,950,000 in 1922 and $34,068,500 in 1928. Between 1922 and 1924 there was a slight decrease in the over-all value per room, the minimum for the entire period being $5,000 reached in the latter year. Since 1924 the over-all value per room has increased steadily to an average of $9,030 in 1927 and $9,017 in 1928. Naturally, there has been a corresponding increase in the average equity per room, although, due to slight fluctuations in the ratio of mortgages to total values, a comparison of equity values is not as accurate as a comparison of over-all values. The average equity per room was lowest in 1922, when it was $2,095, and it reached a maximum in 1927 of $5,059. The increase in the average value per room, whether contrasted with the total value or the equity value, is approximately 100 per cent, and such a startling increase in so short a period of time is worthy of much study. While this increase may be attributed in a large measure to advancing land costs, there are other contributing factors which should be taken into consideration in the planning of future projects, and which will be referred to later.

Indicative of stabilization in the financing of coöperative apartment buildings, it is interesting to note that the ratio of mortgage indebtedness to total over-all prices of land and buildings has remained fairly constant, at approximately 50 per cent. This is due in a large measure to insistence by prominent real estate agents identified with the coöperative movement that the financing of these projects be standardized on a conservative basis. It has come to be almost a cardinal principle in the financing of east side coöperative projects to secure only institutional loans in such conservative amounts as to merit minimum interest rates and minimum amortization. This policy has had the effect of winning the confidence of conservative mortgage institutions, such as life insurance companies, title insurance companies, and savings banks, which now lend freely, but at the same time conservatively, on coöperative buildings.

Contrary to a popular misconception, high amortization of mortgages is not necessarily indicative of conservative mortgage practice, but in most instances it should be taken as a clear signal that the amount of the mortgage is excessive. Due to the high character of the lending institutions identified with the financing of coöperative apartments in New York, the promoter can rest assured that a mortgage loan granted by one of these institutions and carrying low amortization, or even no amortization, presupposes an increment rather than a depreciation in the value of the land and building at the date of maturity. In the interest of economy in operation, as well as of conservatism in financing, I favor the low mortgage with correspondingly low interest rate and low amortization, as opposed to the practice advocated in some other cities of mortgaging heavily with high interest rates and liberal amortization. Advocates of the latter method point to the low equities made possible by high mortgages, but my answer is that under that plan every stockholder-tenant is penalized by the excessive cost of financing, and is deprived of the opportunity of securing the economy that he would enjoy under the plan which I advocate. It is admitted that under the low mortgage plan the purchaser of an apartment is called upon to pay a larger amount of cash, but the saving to him in interest and amortization payments, together with the feeling of security in the knowledge that his building is conservatively financed, offsets the disadvantage of having to expend a greater amount of cash in acquiring his apartment. Moreover, it is nearly always possible for a purchaser to arrange terms for payment for his apartment which limit expense and risk incident to such financing to the individual affected without imposing additional expense upon the other tenant-owners. I have stressed the item of mortgage financing for three reasons,—first, in the interest of conservatism; second, because of its effect upon economy of operation; and third, and most important of all under existing conditions, because of its effect on the initial cost of the project. Due to soaring land values, with which it seems hardly conceivable that rents can keep pace, the promoters of coöperative apartments are called upon to use every means at their disposal of reducing the cost of construction. The cost of financing is an important item and worthy of consideration in planning a coöperative building. It has much to do with its success.

To bring out more fully the meaning of my reference to the relation of rental values to land costs, a word may be in order. It was common practice but

	1922	1923	1924	1925	1926	1927	1928
Number of Projects	3	4	14	17	15	14	17
Number of Apartments	95	216	420	496	385	431	532
Average Number Apartments per Project	33	54	30	29	26	31	31
Number of Rooms	639	1,360	3,412	3,406	2,614	2,783	3,773
Average Number Rooms per Project	213	340	244	200	174	198	222
Total Sales Price	$3,950,000	$7,824,500	$17,072,300	$24,314,500	$20,706,300	$25,129,800	$34,068,500
Average Sales Price per Apartment	$41,579	$36,225	$40,650	$49,000	$53,780	$58,300	$64,038
Average Sales Price per Room	$6,180	$5,750	$5,000	$7,135	$7,920	$9,030	$9,017
Total Mortgages	$2,611,000	$4,010,500	$8,227,600	$11,500,000	$10,591,300	$10,879,800	$15,655,000
Average Mortgages per Apartment	$27,485	$18,566	$19,590	$23,185	$30,300	$25,638	$29,464
Average Mortgages per Room	$4,085	$2,945	$2,411	$3,376	$4,462	$3,970	$4,143
Total Equity	$1,339,000	$3,814,000	$8,844,700	$12,814,500	$9,040,000	$11,050,000	$18,413,500
Average Equity per Apartment	$14,094	$17,659	$21,060	$25,815	$23,480	$32,662	$34,574
Average Equity per Room	$2,095	$2,805	$2,589	$3,759	$3,458	$5,059	$4,874

a few years ago to show an investment return to the coöperative purchaser of from 12 to 15 per cent,— that is to say, the proprietary rental of a given apartment when deducted from the commercial rental value of a similar apartment produced a saving sufficient to represent a yield on the investment of from 12 to 15 per cent. While rental values have become fairly stabilized in the well developed residential areas, such as upper Park and Fifth Avenues and the principal side streets between Fifth and Lexington Avenues, the land values in these areas continue to advance, and instead of an average investment return, such as was just referred to, we now find it difficult to produce a return of more than 10 per cent in these areas. However, since economy is but one of the numerous advantages of coöperative ownership, it does not necessarily follow that a project showing slight economy to purchasers is without merit. It does require that the promoters give more attention than ever to such factors as location, plan, equipment and construction. This condition has also led to the development of new residential areas where lower land costs permit of the delivery of apartments showing satisfactory economy, and notable among these sections may be cited the Sutton Place district.

A distinct factor in the present situation is the great increase in the value of land in the narrow side streets, where the heights of housekeeping apartment buildings are limited by law to one and one-half times the width of a street. The relation of land values to rental values in these narrow side streets is such that it is increasingly difficult to show any economy in a coöperative building of nine stories. This has had the effect of automatically removing most of the plottage on these side streets from the coöperative market, forcing promoters to the avenues and the few wide streets. The demand for plots that will permit the construction of 15-story buildings has had a decided influence upon increase in land values on such streets and avenues as are eligible.

We are forced by this condition to divide coöperative projects into two classes,— one, where the element of economy or saving in rent is ignored and elements of location, exclusiveness, excellence of plan, etc., are stressed; the other, where location is subordinated to economy. As characteristic of the two types, there are now under construction two buildings that may serve to illustrate the comparison. One is 960 Fifth Avenue, where Anthony Campagna, the well known builder of coöperative apartments, is sparing no expense in producing one of the most luxurious apartment buildings ever designed, with an ideal location in the very heart of the Fifth Avenue residential district, on the site of the former Clark mansion. Mr. Campagna is boldly expressing his confidence in the taste of New York's scions of wealth by offering individually planned apartment homes, ranging in size from 13 rooms with five baths to 19 rooms with nine baths, with ceiling heights up to 17 feet, and with living rooms as large as 22 x 40 feet at prices ranging from $130,000 to $310,000. An interesting feature of this building is its having a section for rental, having a separate entrance on 77th Street, and containing about 50 housekeeping suites. The income from this section will be applied to the cost of operating the entire building, resulting in an estimated reduction of the proprietary rental of the owners' apartments to 5 per cent, or less than half of the general average in 100 per cent coöperative buildings. The other project alluded to was conceived in the interest of economy, the idea of the promoters being to supply well designed apartments in an accessible location at prices below the market average and with a proprietary rental that would reflect satisfactory economy and saving over commercial rental values. This building is being constructed by Fred T. Ley & Co., Inc., at 333 East 68th Street, opposite St. Catherine's Park, and will be of 15 and 9 stories, having units of four, six and seven rooms at an average equity value of under $2,800 per room

as against the 1928 general average equity value of $4,874. This price was made possible by low-priced land, opposite the park, where the law permits the construction of a 15-story building. Moreover, due to the unusual depth of the plot, the architects, Van Wart & Wein, were able to design an economical building that covers only 57 per cent of the plot area, providing unusual light and air to all apartments.

For the benefit of those who do not wish to disturb invested capital or who, for any other reason, desire to purchase their apartments from income, a plan has been devised providing for a series of time payments over a period of five years. The method has become the accepted and general practice in the purchase of private houses. Through its use, the purchaser may now acquire an apartment in this building by paying a small portion of the purchase price between the date of purchase and the beginning of occupancy, and then pay the remainder of the amount, like rent, over a period of five years, during which time he may live in the apartment and enjoy its economies and other advantages. Simply stated, the time payment plan provides that anyone buying on January 1, 1928 would pay in cash 30 per cent of the term price of the apartment, the remaining 70 per cent by a note bearing interest at the rate of 6 per cent on the unpaid balance from April 1, 1928, and payable in monthly amounts over a period of five years, the first payment with accrued interest being due and payable October 1, 1928. The note will be secured by the stock and lease pertaining to the suite selected, no other security being required.

To enable the reader to visualize the advantages of the plan, this example sets forth the full details:

Coöperative Apartment, 960 Fifth Avenue, New York
Warren & Wetmore, Rosario Candela, Associated, Architects
Cross & Cross, Supervising Architects

"B" Apartment,—Second Floor

Term sales price	$11,000
Initial payment on signing purchase agreement (30%)	3,300
	7,700
Balance (70%) represented by a note bearing interest at 6% from April 1, 1928, payable in 60 equal monthly installments, beginning October 1, 1928. (The interest from April 1, 1928 to October 1, 1928, amounting to $231. is payable with the first payment on principal of note)	$7,700

Thereafter the total estimated average monthly payment during the five-year period, amounts to $245.82, made up of:

Monthly payment of principal	$128.33
Average monthly interest (varying with the amount of note outstanding)	19.57
Estimated monthly maintenance	97.92
	$245.82

This plan assures the early purchaser of a choice of space and the opportunity of arranging it (within structural limitations) to conform to his own desires, with the further advantage of deferring payments as indicated. Since payments of principal and interest do not begin until October 1, 1928, the purchaser is relieved of the possible burden of making monthly payments while paying rent elsewhere.

Another factor entering into the growing costs and the difficulty of establishing liberal savings to tenant-owners is the commendable improvement in the standards of design, construction and equipment demanded by the present-day purchasers of apartments. Wood-burning fireplaces, adequate closet space, mechanical refrigeration, spacious room sizes, ample baths, well planned kitchens and pantries, and adequate accommodations for servants, are some of the features that are regarded as almost standard in the coöperative apartments of today. Of great interest to the buying public should be another innovation recently introduced by the promoters of coöperative apartments in New York. This is the employment of a supervising architect, engaged with the approval of the agent, to represent the interests of the tenant-owners. Notwithstanding that over $100,000,000 of the public's money has been handled by the agents and builders of coöperative apartments, largely on faith, and with most satisfactory results, a number of farsighted promoters have felt the need of relief from the delicate responsibility of expending these huge sums in the interest of the apartment purchasers without some form of independent supervision over their stewardship. It is the duty of the supervising architect to review and approve the specifications of the building; to inspect the work of construction, and to render fortnightly reports in duplicate to the agent and the builders; to call attention to departures from the specifications, if any occur; to issue certificates to accompany calls for progress payments by purchasers, certifying that the work performed by the builder is in accordance with the terms of the purchase agreement; and finally, to deliver to the owning tenants a certificate to the effect that the building has been completed in full accord with the contracts and specifications under which the tenant-owners have acquired their respective apartment homes. In addition to these contractual obligations, the supervising architect coöperates with the builder, the architect and the tenant-owners in harmonizing the interests of each and in producing a building of the highest possible standards at the lowest possible costs consistent with the specifications and terms of the plan of organization. In several of the recent coöperative projects an independent lawyer has been engaged to represent the tenant-owners, it being his duty to examine and approve the plan of organization, the proprietary leases, and the agreements for purchase of stock, the certificate of incorporation and by-laws of the apartment corporation, the builders' agreement, the agreement with the managing agent and all other legal papers in which the tenant-owners have an interest.

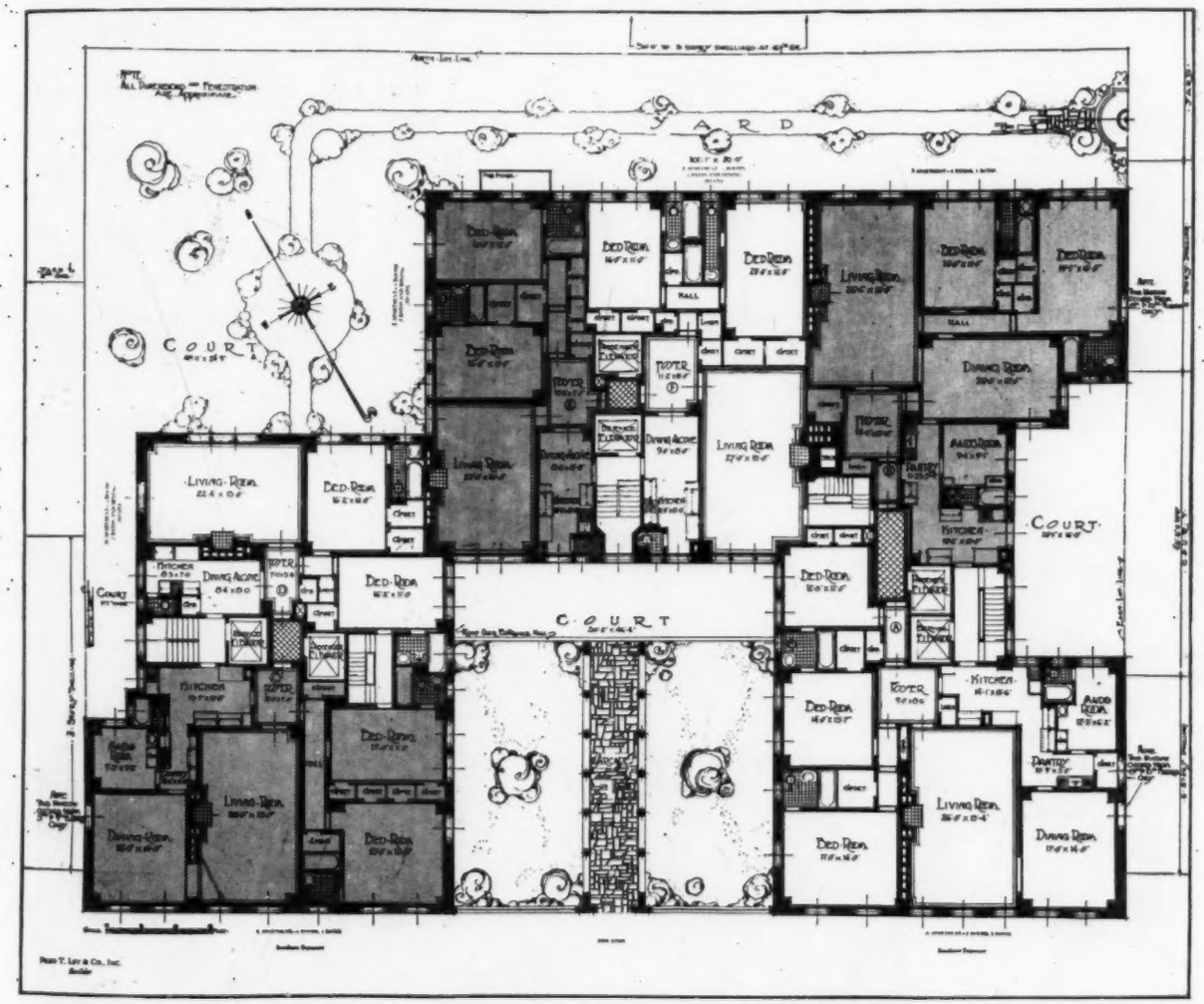
Whether an independent attorney is engaged to represent the interests of the tenant-owners or not, it is highly desirable that the attorney selected by the promoters to handle the legal matters pertaining to the plan of organization, forms of contracts, proprietary leases, etc., be experienced in this work. In fact the legal aspect of coöperative apartment house development and organization is highly technical and calls for the services of specialists in this particular field. It is not sufficient that the plan of organization be limited to the individual project; it must be considered as a part of an important and growing industry, and consideration must be given to the effect upon this industry that might result in a future controversy, occasioned by an improperly framed plan of organization or proprietary leases. This imposes upon the promoters of these projects the distinct obligation of placing their legal affairs only in the hands of attorneys thoroughly conversant by experience with the ramifications of coöperative housing. While these matters may not directly affect the interests of the promoters, they are of vital importance to the tenant-owners, and it is most important that the certificate of incorporation, the plan of organization, supplementary contracts, proprietary leases and other documents be drawn with a view to protecting the tenant-owners to the fullest possible extent.

The scarcity of plottage and the high land values already alluded to have been influential in the introduction of the leasehold coöperative apartment, where the land is leased for a long term of years, usually for 21 years, with three renewals. Notable among coöperative apartment buildings constructed on leased property may be mentioned 280-290 Park Avenue, 300 Park Avenue, 810 Fifth Avenue, and 775 Park Avenue. As an offset to the obvious objec-

tion that the ownership of the building passes from the control of the tenant-owners at the termination of the lease, it has been found expedient to establish a sinking fund, the amount of which, when invested semi-annually and compounded during the period of the lease, will be sufficient to reimburse the tenant-owners for the amounts originally expended by them in the purchase of their apartments. The amount required to be invested semi-annually in order to accomplish this purpose is surprisingly small, and in relation to the total operating expense, when distributed to the respective tenant-owners, becomes almost negligible. The objections to the leasehold type of apartments result largely from a state of mind, and it is believed that as the public becomes better acquainted with this plan the present objections will disappear. In fact, some well informed real estate men see in the leasehold coöperative a means of making available plottage now withheld from the market. Some owners of desirable plottage refuse to sell, but might be content to make long term leases at reasonable figures where the income is as assured as it is in such an instance.

A comparison of the merits of the 100 per cent coöperative plan and the group ownership or partial coöperative plan would require too much space to justify its inclusion herein. Each plan has distinct advantages, and each offers some disadvantages by comparison with the other. Generally speaking, it may be said that the 100 per cent plan is more conservative in that loss from vacancies is eliminated, whereas in the group ownership plan vacancies of the rented apartments may occur, thereby affecting the proprietary rentals of the owner-tenants. On the other hand, a successful group ownership building with no vacancies results in a substantial reduction in the proprietary rentals of the owner-tenants.

In the promotion and financing of coöperative apartments, whether under the 100 per cent plan or the group ownership plan, the help of a wholly trustworthy firm of real estate brokers, with broad experience, is of the utmost value. Such a firm knows land and rental values, and is in a position to advise with the promoters and to safeguard their interests.



A Typical Floor Plan, 333 East 68th Street, New York
Van Wart & Wein, Architects
Cross & Cross, Supervising Architects

CAN THE ARCHITECT SERVE THE SPECULATIVE BUILDER?

BY

GEORGE F. ROOT, 3rd

HAD this question been asked as recently as a decade back, the answer given by the great majority of those who were engaged in erecting residences for selling would have been a sharp negative. Builders were for "cutting costs" in this kind of enterprise in every respect. They felt that if they could produce a structure containing a given number of rooms, almost regardless of arrangement or shape, using visible materials and colors which would catch the public's eye, and could get this effect with the cheapest materials which would hold together for a year or two after completion, then a quick sale with good profit would result. It usually did result. So, the builder would reason, why go to the costly and unnecessary extent of consulting an architect? The prospective buyer, a layman, knew little or nothing of architectural design, either external or internal, nothing of good plan, good circulation and the taking advantage of land contours, exposures and outlooks; nor was he even particularly interested, if the house was of a size to shelter his family, and if the visible construction made the thing look like a "good buy." Thus we saw row upon row, everywhere, of contractor-designed residences of quite horrible aspect, inside and out,—things from which architects and designers could not but turn a bruised eye,—houses sold, occupied, and containing numberless contented residents; and we saw hundreds of contractors, encouraged by the ready selling market, grow prosperous from the undiscriminating public taste. Why, indeed, go to any highfaluting architect with his talk of "proportion" and "harmony" and "style"? The builder could get out his carpenter's pencil and square and a piece of building paper and produce a drawing which would be adequate for translation into a salable house.

Nineteen twenty-eight will not be the millennium in this regard. There are still being erected residences without harmony of form or arrangement, laid out without expert guidance, but unquestionably the builders who sell have begun to feel the existence of a new and different condition. The fact is that the public has begun to discriminate. The tremendous volume of residential work which has been designed by architects for private clients during the last 20 years, and the ever-increasing merit of this design, have more than merely begun to impress those who would "rather buy than build." The average intelligent layman is beginning to compare. He is shown by the enthusiastic agent a new house which can be bought. Consciously or not, he forms a comparison between it and the houses of his friends who have "had architects." He sometimes goes wrong and accepts that which is not architecture; but his percentage of bad choices is diminishing at an accelerating rate. Even now, more often than

Editor's Note. The Quality of Architectural Design Is Important in Selling an English Stucco House

George F. Root, 3rd, Architect

not, the buyer knows, by having seen good residence design, whether the offering shows trained conception and sound structure; he is more discriminating.

Not only does he perceive better than formerly whether he is getting full value intrinsically and æsthetically only at the time of inspection. The consideration of the resale value, should he ever wish to move away or capitalize his holding for any reason, enters into his decision and often determines it; for the better the design, the more it will bring in a later transaction. And there are now not infrequent cases, some completely authenticated, where a prospective buyer asks to be allowed to consult the architect before making up his mind as to a purchase in order to be informed as to the future possibilities of harmonious and practicable addition to the house; and when this is found to be entirely feasible, as is usually the case with an architecturally designed house, the deal is that much likelier to be made. Back in the recent dark ages of American speculative building the seller, if asked by his prospect, "Who designed this house?" could expand the chest, thumb the armholes, and throwing modesty aside could reply, "I did; you are at this very moment in his presence!" and get his desired effect. Now that seller is demonstrably better off if he can point to a reputable architect by name as having done the work. For his prospect realizes that services so peculiarly special as those of residence designing are better performed by specialists who concentrate on and make a life work of it.

This is by no means mere theory. The writer has watched it work in particular instances. In the case of one high class suburban acreage which was subdivided four years ago and sold in large measure to builders, he has watched the results in the development of perhaps two dozen residences erected for sale, with the land included, at prices ranging from $25,000 to as high as $75,000. In certain instances the hit-or-miss house has found its buyer promptly,—say upon completion. But in an impressive majority of cases it has been the dwelling built from an architect's pencil which has proved to be the "hot cake." The $75,000 property referred to, architecturally designed, was sold at the asking price before the painters were out of it. It has not been rare that the architectural house has got its man before the foundation has been completed, while there have been a number of houses sold from the architect's plans before a spadeful of earth was turned. Say that economic conditions have been right, the lots desirable, and the selling market good. Yes, but no more so for the one kind of house than for the other. When one house stands stark and empty for two years, while its neighbor is "gone" before completion, it is evident that something is operating in the mind of the buying public. The writer believes that it can be only a newly acquired and ever-increasing discrimination and architectural *savoir*.

But there is that architect's fee!—some builders still complain. The idea of paying 8 or 10 per cent of the cost of the work, as they hear of private clients paying, seems a lot to take off their profit. They are wrong about that in two ways. They do not realize that when designing for a builder, by being relieved, first, of the time necessary for detailed supervision of construction, and second, of the responsibility to the client for the exact following of a detailed specification, the architect can reduce his fee considerably from what he must charge a layman client. Therefore the architect can supply preliminary sketches, general working drawings, outline specifications, and full detail drawings, with perhaps an occasional visit to the work (which is in the architect's own interest anyway) for a sum which should be, and has been, regained by the builder thrice over in the added market value of his finished project. The architect's fee has rightly earned its place in the builder's budget.

An instance is brought to mind of a builder who had been doing his own designing with only moderate success. One of his backers prevailed upon him to consult John Doe Smith, architect, regarding the house he was then contemplating. The builder had drawn his tentative plan, and brought it to Mr. Smith for examination and suggestion. The latter found the layout meritorious in a number of respects, but lacking otherwise that *savoir* referred to here. For instance, one had to cross both the pantry and the long dimension of the kitchen in order to reach the cellar stairs. Now it seems beyond dispute that the householder would only slightly prefer to avoid walking the nautical plank than to run the gauntlet of a servant-filled cuisine while in the discharge of his heating or fermenting or other cellar routine. The stairs were re-located so as to be reached from either the service or the master portion of the house. Again, the master bathroom was arranged so that it contained two doors, one from each adjoining bedroom. It was a simple matter for the architect to rearrange it so that this bathroom possessed only one door (always preferable to two) but with access from each bedroom through a small private vestibule. Many other interior suggestions, as well as an entire re-study of the exterior were made. Not only made, but accepted with amazing alacrity by the builder. Though not wishing to have this paragraph read like a testimonial to the results of three applications of, say, "Tonex," since which no substitute has been accepted, the writer has observed that this builder has done no more work without architectural service, and that his success in the locality is being for the first time widely remarked.

The architect serves the speculative builder, moreover, in other ways than in giving the latter's product beauty of aspect and propriety of plan. He is ready to be consulted as to proper placing of the building on the plot, keeping back from the street or away from undesirable side or rear line conditions; to counsel appropriate planting, walks, and in some cases garden layouts, all features which can attract

Editor's Note. An Excellently Designed House that was Sold before Completion
George F. Root, 3rd, Architect

or repel a buyer; he can lead the builder away from unsightly fireplaces and mantels and give him a "selling point" in their stead; he is often familiar with the newest trends in even such prosaic equipment as ranges, plumbing fixtures, tiling and the like; above all, in a word, he can become indispensable in getting the most fof the builder with the least expenditure.

There is another aspect to this question which is broader than that of the architect's value to the individual speculatively-built dwelling. In the case of the subdivided acreage referred to here, the plots were sold to different individuals, each with his own idea of what should be built on his piece. Now that the development is largely completed, we find a curi-

Editor's Note. Anachronisms in Design, such as the Peculiar Fenestration, Have Kept this House Vacant
A House Typical of "Contractor Design"

Editor's Note. A Colonial House that Found a Ready Purchaser Because of Its Design
George F. Root, 3rd, Architect

ously mixed appearance in the locality as a whole. In many instances we see individual units which are well conceived and executed as to house design, planting, and general aspect. Next door there may be also a successful result. But between them there is no harmony of relationship, no team work. Colonial, Spanish, English, alternating irregularly dov n the street, a series of well designed houses, perhaps, but entirely unrelated, with no common thread to pull them together into a harmonious and unified whole. Thus we lose in this country, through the fact that our best design bases itself on the various styles of the past and through the fact that the selection of style is generally at the layman owner's op-

Editor's Note. In the Same Development as the Others, Its Design Has Retarded the Sale of This House
A Good Architect Could Have Aided the Builder

tion, that harmony of community design which we find so charming in the countryside of England and France and Italy, where in each country the style is indigenous to the locality. This loss is, of course, unavoidable in the case of most American community developments, where properties are sold to unrelated individuals. Here team work is about impossible, and the most we can hope for, unless one architect or group of associated architects can be retained by the various plot buyers and allowed to work on a group of properties, is a heterogeneous aspect when development has been completed.

But there are scores of instances where an individual builder or a syndicate of speculators purchases a considerable number of adjoining plots, even an extensive acreage, and it is here that the architect can serve not merely the unit but the whole. A decision as to the general architectural style can be reached between architect and client, and the architect can go to work relating his units to one another as regards both style and plan. He can put service wings and garage drives of adjoining units together, keeping main living rooms in their proper relation, each to its neighbor. He hasn't that doubtful fear that on an undeveloped lot adjoining a service yard and garage entrance will be the main features of his living room view, or that the clothes yard which he is placing for his client is going to bring the ill will of whoever builds next door. He can produce a community of residences, the charm and therefore the selling price of each of which will be enhanced, not diminished, by the presence of its neighbor. An instance of the success of this plan of procedure by the developer may be of interest. There is a large acreage in a Philadelphia suburb, Chestnut Hill, which has been steadily developed by an individual, Dr. George Woodward, during some 20 years. One drives through it now and is quite startlingly impressed with the varied uniformity which pervades this entire district. It is an architecture of stone, easily quarried nearby, which is seen in almost every building; it is the old Germantown style, freely adapted and varied, which greets the driver over the curving streets. Harmony without monotony everywhere. How was this happy result achieved? The developer, from the start, has made certain to employ trained architects to carry it on. Not one but successive architects, each in sympathy with the last, each carrying on under this most intelligent developer's direction. One does not find many Chestnut Hills, harmonious, varied, charming, triumphs of the side-by-side efforts of developer and architect!

But this branch of the architect's usefulness to the speculator can sometimes go even one step further afield. Where the purchasers of acreage secure sufficient land to require planning of new streets to subdivide it, skill is required to get the most out of the possibilities for development. Too often we have seen the old "checkerboard" layout, stiffly rectangular blocks formed by stiffly straight streets,—no curves to give good perspectives, no interest in the conception,—just monotonous square intersections, acre after acre. Something better than this can be devised, no matter how flat and treeless the ground, and the architect can devise it. The writer is reminded of a suburb of New York which was given its first real development about 25 years ago. The original developers had the good sense, in its very inception, to form a street layout for many hundred acres which embraced scarcely a straight road. This plan has been followed, and the absence of regularity of streets is regarded by its residents as one of the chief charms of the village. It is perhaps not of frequent occurrence, but when large acreage is purchased for development, as well as when one house is contemplated, the architect can serve his builder-client to the latter's advantage,—yes, monetary advantage,—even from the start of the operation.

Architectural Merit Was the Greatest Factor in the Purchase of This House

George F. Root, 3rd, Architect

BUILDING ACTIVITY IN 1928 TO CONTINUE ON THE SAME SCALE AS IN 1927

BY

C. STANLEY TAYLOR

IN attempting to establish a forecast of building activity for the year 1928, we face a paradoxical condition. On the one hand we have casually expressed opinions indicating less building activity than in 1927; on the other hand, we have the actual evidence of work under way on architects' boards or seriously contemplated for 1928 which indicates that building will continue at least in the same volume if it does not reach even greater totals than last year. The figures presented in the forecast tabulation included here have been developed in the same manner that the Research Department of THE ARCHITECTURAL FORUM has used in carrying out successful forecasts for six consecutive years. Confidential reports were received from almost 2,000 architects, covering the amount of work on their boards or under serious consideration for this year, and from these figures through a series of weighting factors, the forecast figures given here were established. There has been no deviation in the method of developing the forecast, and because this method has produced successful results for so many years, it would seem obvious that no drastic change in its operation could be expected this year unless some unusual series of business conditions had developed suddenly to change the entire economic balance of the country.

If we seek further to analyze this apparently paradoxical situation, wherein many are predicting a sharp falling off of building in the year 1928, although most forecasts are to the contrary, we seem to discover controlling factors of an unusual nature, which after all may offer a simple explanation. It is to be noted that those who are making casual predictions anticipating a considerable decrease in the building volume are located in large centers where there is perhaps an over-built situation which would influence opinion. Perhaps the idea of decreased activity in the building field is a natural

1928 PREDICTION BY DISTRICTS IN 19 BUILDING CLASSIFICATIONS

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U.S.A.
Automotive	$16,702,000	$68,716,000	$8,214,000	$17,554,000	$67,605,000	$18,640,000	$197,431,000
Banks	10,674,000	72,693,000	2,278,000	10,202,000	34,300,000	7,247,000	137,394,000
Apartments	10,437,000	347,500,000	13,862,000	22,400,000	186,400,000	72,230,000	652,829,000
Apartment Hotels	572,000	56,787,000	4,970,000	12,935,000	105,987,000	36,267,000	217,518,000
Club, Fraternal, etc.	10,557,000	46,287,000	2,937,000	15,000,000	86,742,000	14,440,000	175,963,000
Community and Memorial	3,146,000	13,400,000	580,000	5,265,000	41,760,000	10,645,000	74,796,000
Churches	19,860,000	48,740,000	12,635,000	20,900,000	71,367,000	37,640,000	211,142,000
*Dwellings (Below $20,000)	19,780,000	76,730,000	8,700,000	16,360,000	49,400,000	26,372,000	197,342,000
Dwellings ($20,000 to $50,000)	11,420,000	69,210,000	7,935,000	12,150,000	37,610,000	24,640,000	162,965,000
Dwellings (Over $50,000)	8,700,000	44,935,000	6,720,000	11,345,000	31,210,000	16,660,000	119,570,000
Hotels	21,487,000	107,272,000	19,950,000	45,175,000	105,200,000	42,917,000	342,001,000
Hospitals	22,724,000	104,210,000	8,715,000	21,320,000	110,114,000	39,200,000	306,283,000
†Industrial	18,215,000	79,362,000	7,100,000	12,222,000	121,000,000	22,917,000	260,816,000
Office Buildings	26,376,000	139,674,000	9,854,000	57,473,000	263,413,000	87,720,000	584,510,000
Public Buildings	24,207,000	122,761,000	4,893,000	17,869,000	132,171,000	28,900,000	330,801,000
Schools	42,371,000	197,613,000	36,827,000	46,282,000	163,413,000	82,666,000	569,172,000
Stores	11,780,000	54,776,000	5,103,000	8,086,000	39,763,000	26,713,000	146,221,000
Theaters (All Types)	21,920,000	43,114,000	4,167,000	3,777,000	71,620,000	17,340,000	161,938,000
Welfare Y.M.C.A., etc.	10,140,000	41,614,000	4,700,000	5,731,000	38,246,000	6,143,000	106,574,000
TOTAL VALUE OF NEW BUILDINGS	$311,068,000	$1,735,394,000	$170,140,000	$362,046,000	$1,757,321,000	$619,297,000	$4,955,266,000

New Construction Under Architect's Specifications. As shown in above tabulation	$4,955,266,000
*Small Dwellings Not Designed by Architects. Estimated about 80% of total	789,368,000
†Industrial Buildings Not Designed by Architects. Estimated 50% of total	260,816,000
Other Buildings Not Designed by Architects. Estimated at 10% of total after deducting above two classifications	499,678,000
TOTAL ESTIMATED EXPENDITURE FOR NEW BUILDINGS IN 1928	$6,505,128,000 (Not Including Public Works and Utilities)

reaction of the human mind which refuses to believe that good conditions can last so long. This is substantiated by the fact that most of those who are pessimists about building activity are also pessimistic about national prosperity. Of course, if general business conditions become straitened and the confidence of the public is shaken, building activity will be materially influenced. The volume of building construction, and particularly the volume of contemplated construction as expressed by plan filing, is not a *barometer* of business conditions, as it is so often called. It is a *mirror* of business conditions, and it does not primarily affect prosperity in one way or another, but is in itself an effect of our general business situation. In prosperous times we build in huge volume to meet not only the various necessary requirements for space but also to meet the requirements of a standard of commercial and domestic housing in keeping with ability to pay for greater comfort and utility,—an ever-improving standard.

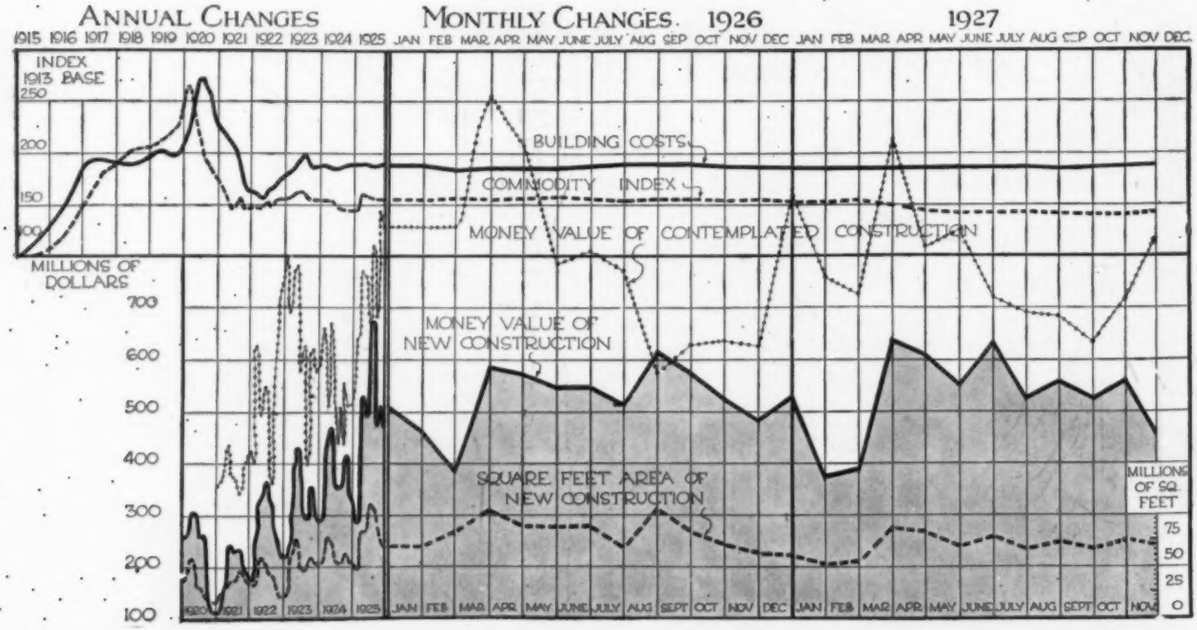
With these thoughts in mind, is it not reasonable to believe that there may be a basic explanation for the evident paradox of contrary opinions as to building activity? Perhaps we have not been passing through a real "boom." Perhaps the continued building activity which, as an examination of the chart on the next page will show, has been going on in increasing volume since 1924, is primarily based on greatly increased building requirements coupled with prosperous conditions which have provided the means for this great investment. After all, the population of this country during the past ten years has been increased by many millions, for whom shelter of all kinds must be provided. The tremendous volume of existing construction which has been added to annually must of necessity require greater activity each year to take care of obsolescence and replacements. The fire losses grow greater annually, in spite of efforts to curb them, but it may be noted that they do not grow larger in proportion to the total number of buildings. They grow larger because the total area of risks has been greatly increased.

A COMPARISON OF PUBLIC DEMAND FOR NEW BUILDINGS AS SHOWN IN 1927 AND 1928

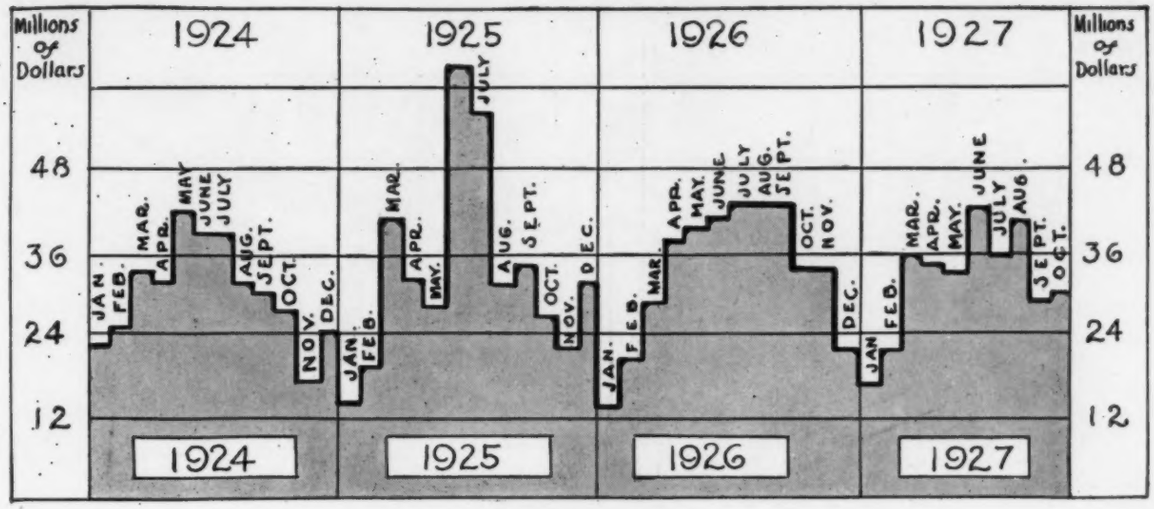
The figures given here apply to projects as reported by architects and represent the percentage of the valuation of each building type as compared with the total value of projects for the district.

NORTHEASTERN STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1927	*1928*	*Change*
Automotive	2.5	5.4	+2.9
Banks	4.5	3.4	—1.1
Apartments	6.	3.3	—2.7
Apartment Hotels	2.	.2	—1.8
Clubs, Fraternal, etc.	3.	3.4	+ .4
Community and Memorial	1.1	1.	— .1
Churches	10.9	6.4	—4.5
Dwellings (under $20,000)	3.	6.4	+3.4
Dwellings ($20,000 to $50,000)	2.	3.7	+1.7
Dwellings (over $50,000)	2.	2.8	+ .8
Hotels	5.6	6.9	+1.3
Hospitals	4.8	7.3	+2.5
Industrial	11.9	5.8	—6.1
Office Buildings	8.9	8.5	— .4
Public Buildings	8.	7.8	— .2
Schools	15.	13.6	—1.4
Stores	1.4	3.8	+2.4
Theaters	5.4	7.	+1.6
Welfare, Y.M.C.A., etc.	2.	3.3	+1.3



Here the building situation is shown at a glance. The various index lines are explained on the chart. This information is developed from reports of the United States Department of Commerce, the F. W. Dodge Corporation, and *The Engineering News-Record*



Four Years of School and College Building

NORTH ATLANTIC STATES

Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	2.1	3.9	+1.8
Banks	4.5	4.2	— .3
Apartments	18.5	20.	+1.5
Apartment Hotels	6.6	3.3	—3.3
Clubs, Fraternal, etc	3.5	2.6	— .9
Community and Memorial	1.6	.8	— .8
Churches	5.6	2.9	—2.7
Dwellings (under $20,000)	2.3	4.4	+2.1
Dwellings ($20,000 to $50,000)	2.2	4.	+1.8
Dwellings (over $50,000)	1.9	2.6	+ .7
Hotels	5.2	6.2	+1.
Hospitals	7.1	6.2	—1.1
Industrial	7.5	4.6	—2.9
Office Buildings	10.9	8.	—2.9
Public Buildings	5.7	7.1	+1.4
Schools	8.1	11.4	+3.3
Stores	2.4	3.1	+ .7
Theaters	3.	2.5	— .5
Welfare, Y.M.C.A., etc	1.3	2.4	+1.1

SOUTHWESTERN STATES

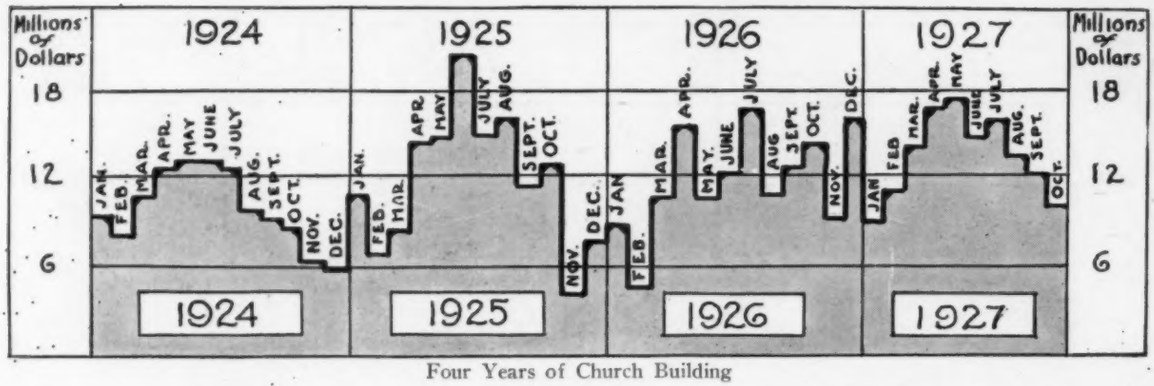
Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	2.8	4.8	+2.
Banks	2.	2.8	+ .8
Apartments	8.	6.2	—1.8
Apartment Hotels	2.	3.6	+1.6
Clubs, Fraternal, etc	4.	4.1	+ .1
Community and Memorial	5.2	1.5	—3.7
Churches	10.2	5.8	—4.4
Dwellings (under $20,000)	3.5	4.5	+1.
Dwellings ($20,000 to $50,000)	4.	3.4	— .6
Dwellings (over $50,000)	1.5	3.1	+1.6
Hotels	10.8	12.5	+1.7
Hospitals	5.2	5.9	+ .7
Industrial	5.3	3.4	—1.9
Office Buildings	13.7	15.9	+2.2
Public Buildings	2.9	4.9	+2.
Schools	12.5	12.8	+ .3
Stores	2.	2.2	+ .2
Theaters	3.2	1.	—2.2
Welfare, Y.M.C.A., etc	1.2	1.6	+ .4

SOUTHEASTERN STATES

Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	4.6	4.8	+ .2
Banks	2.3	1.3	—1.
Apartments	8.4	8.2	— .2
Apartment Hotels	3.2	2.9	— .3
Clubs, Fraternal, etc	5.2	1.7	—3.5
Community and Memorial	1.	.3	— .7
Churches	6.9	7.4	+ .5
Dwellings (under $20,000)	4.	5.1	+1.1
Dwellings $20,000 to $50,000)	4.2	4.7	+ .5
Dwellings (over $50,000)	1.1	4.	+2.9
Hotels	15.	11.7	—3.3
Hospitals	5.	5.1	+ .1
Industrial	2.	4.2	+2.2
Office Buildings	5.	5.8	+ .8
Public Buildings	4.	2.9	—1.1
Schools	13.8	21.6	+7.8
Stores	8.	3.	—5.
Theaters	4.	2.5	—1.5
Welfare, Y.M.C.A., etc	2.3	2.8	+ .5

MIDDLE STATES

Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	3.2	3.8	+ .6
Banks	2.6	1.9	— .7
Apartments	10.	10.	+ .6
Apartment Hotels	3.	6.	+3.
Clubs, Fraternal, etc	5.	4.9	— .1
Community and Memorial	2.	2.4	+ .4
Churches	6.	4.1	—1.9
Dwellings (under $20,000)	2.	2.8	+ .8
Dwellings ($20,000 to $50,000)	2.4	2.1	— .3
Dwellings (over $50,000)	1.1	1.8	+ .7
Hotels	5.7	6.	+ .3
Hospitals	4.9	6.3	+1.4
Industrial	8.6	6.9	—1.7
Office Buildings	16.6	15.	—1.6
Public Buildings	4.	7.5	+3.5
Schools	13.6	9.3	—4.3
Stores	1.6	2.3	+ .7
Theaters	5.8	4.1	—1.7
Welfare, Y.M.C.A., etc	1.9	2.2	+ .3



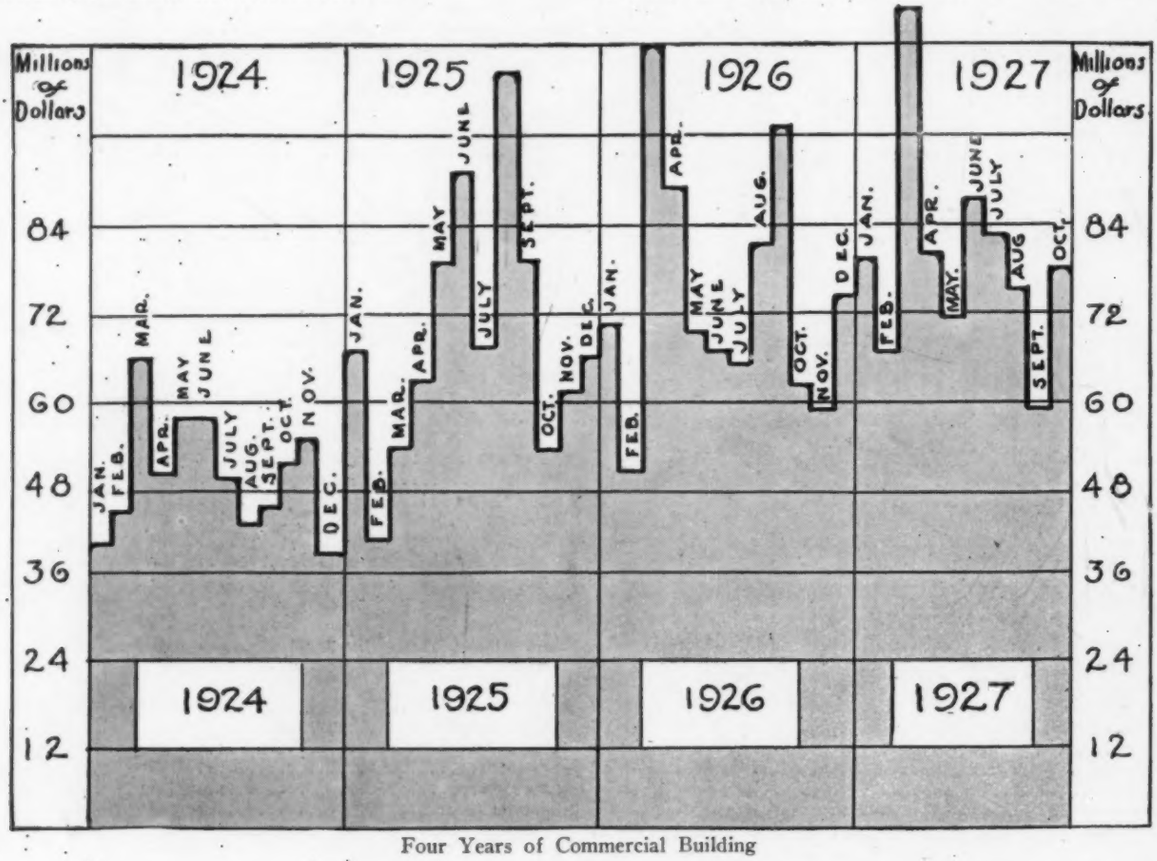
Four Years of Church Building

WESTERN STATES

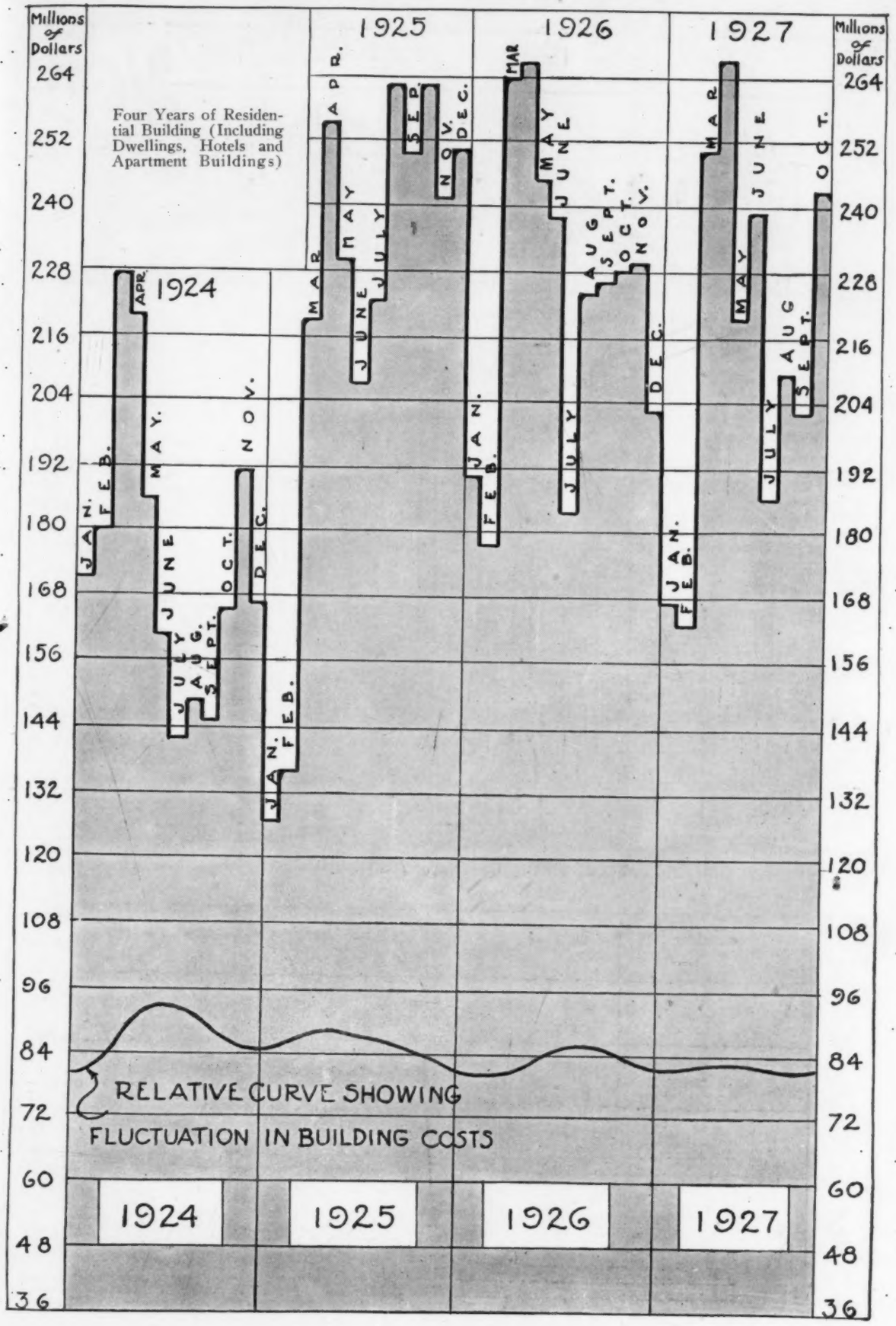
Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	3.6	3.	— .6
Banks	2.	1.2	— .8
Apartments	9.8	11.7	+1.9
Apartment Hotels	4.3	5.9	+1.6
Clubs, Fraternal, etc	6.3	2.3	—4.
Community and Memorial	1.9	1.7	— .2
Churches	6.2	6.1	— .1
Dwellings (under $20,000)	3.	4.3	+1.3
Dwellings ($20,000 to $50,000)	2.3	4.	+1.7
Dwellings (over $50,000)	1.9	2.7	+ .8
Hotels	11.3	6.9	—4.4
Hospitals	3.9	6.3	+2.4
Industrial	2.9	3.7	+ .8
Office Buildings	11.6	14.2	+2.6
Public Buildings	9.6	4.7	—4.9
Schools	13.9	13.3	— .6
Stores	2.1	4.1	+2.
Theaters	2.4	2.8	+ .4
Welfare, Y.M.C.A., etc	1.	1.	—

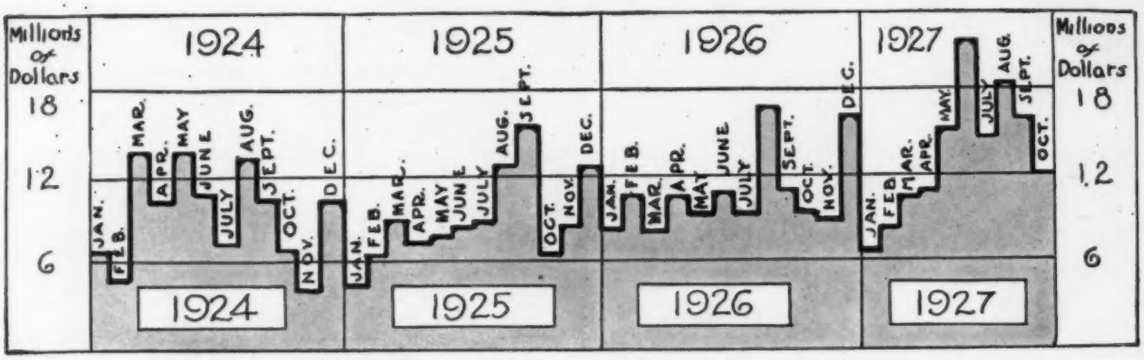
NATIONAL PERCENTAGES, U. S. A.

Type of Building	Requirements for New Buildings by Percentages 1927	1928	Change
Automotive	2.8	3.9	+1.1
Banks	3.3	2.8	— .5
Apartments	12.5	13.2	+ .7
Apartment Hotels	4.3	4.4	+ .1
Clubs, Fraternal, etc	4.3	3.5	— .8
Community and Memorial	2.	1.5	— .5
Churches	6.5	4.3	—2.2
Dwellings (under $20,000)	2.4	4.	+1.6
Dwellings ($20,000 to $50,000)	2.4	3.3	+ .9
Dwellings (over $50,000)	1.9	2.4	+ .5
Hotels	6.9	6.9	—
Hospitals	5.6	6.2	+ .6
Industrial	7.3	5.3	—2.
Office Buildings	12.7	11.8	— .9
Public Buildings	5.6	6.7	+1.1
Schools	11.7	11.5	— .2
Stores	2.2	2.9	+ .7
Theaters	3.9	3.3	— .6
Welfare, Y.M.C.A., etc	1.7	2.1	+ .4

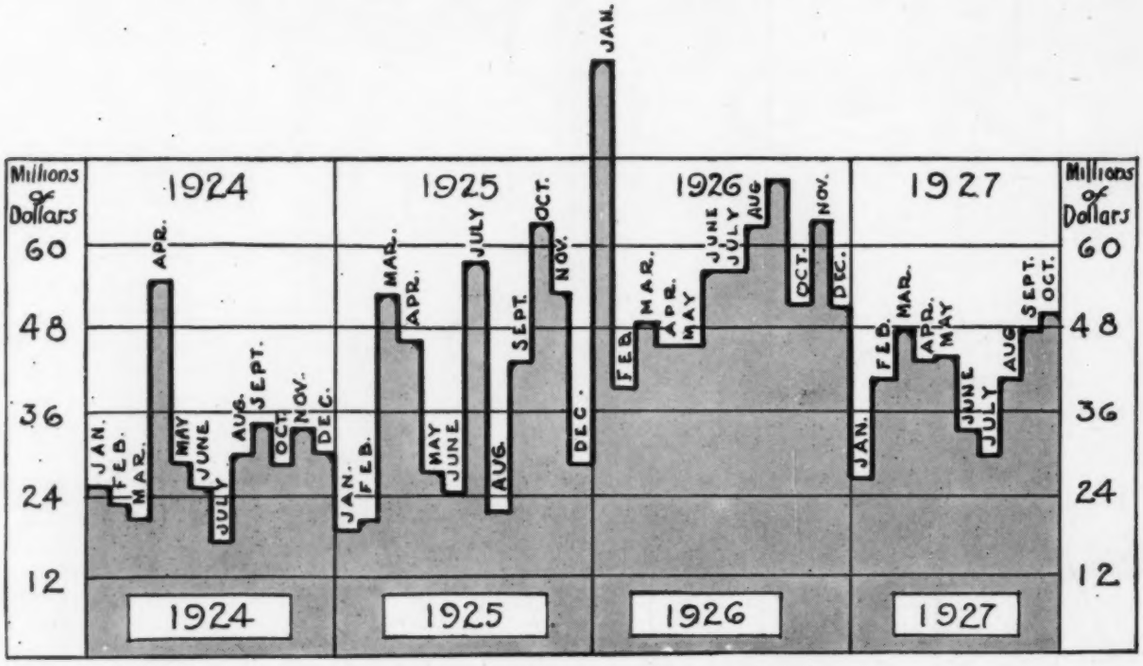


Four Years of Commercial Building

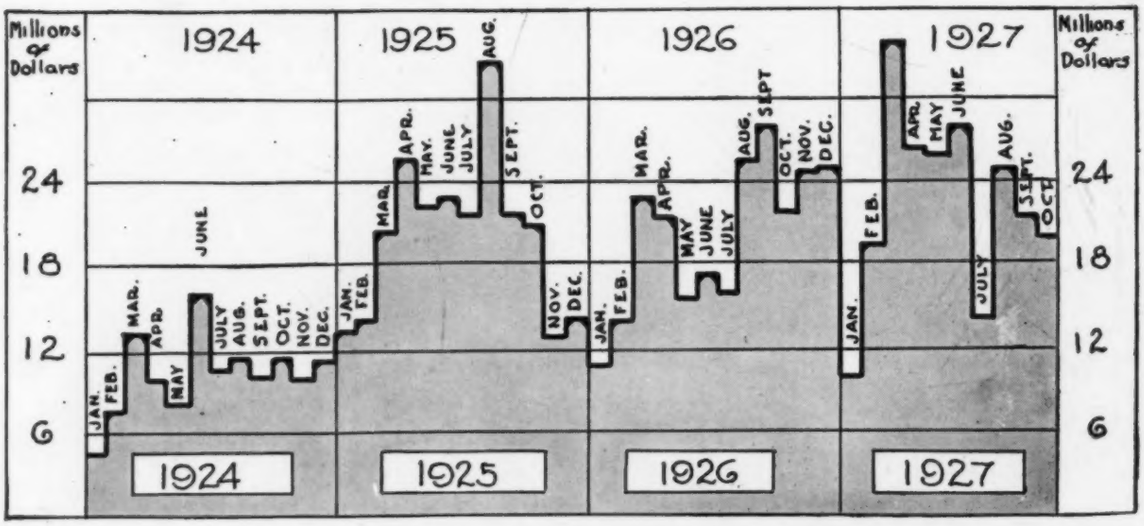

Millions of Dollars
264
252
240
228
216
204
192
180
168
156
144
132
120
108
96
84
72
60
48
36
Four Years of Residential Building (Including Dwellings, Hotels and Apartment Buildings)
1924
1925
1926
1927
JAN. FEB. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB.
MAR APR. MAY JUNE JULY SEP. NOV. DEC.
JAN. FEB. MAR MAY JUNE JULY AUG SEPT. OCT. NOV. DEC.
JAN. FEB. MAR MAY JUNE JULY AUG SEPT. OCT.
RELATIVE CURVE SHOWING
FLUCTUATION IN BUILDING COSTS
1924
1925
1926
1927



FOUR YEARS OF HOSPITAL AND INSTITUTION BUILDING



FOUR YEARS OF INDUSTRIAL BUILDING



FOUR YEARS OF CLUB AND FRATERNAL BUILDING

HOUSING—THE RESPONSIBILITY OF THE BUILDING INDUSTRY

BY

By JOHN TAYLOR BOYD, JR.

AYMAR EMBURY II has done real service to architects and to the building industry in joining, in THE FORUM for October, those who are calling public attention to the housing problem. One may disagree with him in some respects, but there is certainly no exaggeration in his gloomy picture of the failure of the building industry to master the situation. One may regret, however, that Mr. Embury did not mention the success of the huge housing operation of the Metropolitan Life Insurance Company as casting a bright ray of hope across the dark scene. For architects and their fellows in the building industry, the most pertinent fact is that they are responsible for the failure and for the disastrous effects which may react upon them if they do not repair this failure, and as promptly as possible.

I propose here to point out the extent of the failure of the building industry in housing, and its possible consequences. In so doing I shall confine myself to the economic and architectural side of housing, and shall avoid the sociological aspect. Not that the sociological aspect is not important. It is important, and in the design of an actual housing operation, the bearing of the sociological side on the architectural design must be clear to the architect employed. On the other hand, in a general discussion of housing, I believe that architects, builders and real estate men will do well not to stray too far into the sociological field, for it has many pitfalls, and is far removed from our usual experiences. In fact, I have seen a gathering of real estate managers, who were called together to discuss the management side of housing, become so tangled in sociology that they could not think intelligently of their own part in the problem. It was as if a group of architects, called together to offer general suggestions on hospital architecture, attempted to decide problems of medicine; they would no longer be acting as architects, but as laymen.

In confining ourselves to our own part in housing, the first essential is to realize that the building industry is one of the basic industries of the nation, and that it is responsible for providing a clear majority of the American people with sound homes, of standards suited to American habits of living, and that it is the function of the architects to design the houses which the building industry constructs. If we architects do not understand that we have this task before us, there is little point in our discussing housing as an architectural matter. But if, on the other hand, the building industry does see that providing housing is its work,—just as it is the task of every basic industry in the American economic organization to supply the need for its particular product among a majority at least of the population,—then architects and builders will understand that the failure in the housing field is put up to them to make good. And I believe that the building industry will make good the failure. I have enough confidence in my own profession and in the industry of which it is a part to feel sure of that. Having devoted myself to housing extensively since the war, I have practical reasons for my belief, but even if I had not, even if in every respect the situation seemed hopeless, I would still think that the men in the building industry had it in them to do the work. For to believe otherwise would be to mark out the building industry as different from all other basic industries, incapable of playing its part in American economy. The automobile industry has succeeded in providing nearly every American family with a car. Ten years ago that would have seemed too absurd to be taken seriously, and only five years ago the "saturation point" in automobile manufacture was a familiar topic. Shall it be said that the building industry cannot supply the American people with homes?

First comes the "scope of the work," as the specification reads. The problem is nation-wide throughout industry. Exceptions are confined chiefly to a few favored localities where construction costs and site costs which are well below average go hand in hand with high wages. More specifically, practically all the housing, of any type whatsoever, constructed since the war is produced only for the upper economic third of the population. It is the other two thirds,—the majority of the population,—which it is the task of the building industry to reach. Here, in this statement that houses must be built for two-thirds of the population, is the size of the undertaking that awaits the industry in the next few years.

Let us realize what this means to us in the building industry,—an opportunity greater than any previously open to us, or a failure which will be disastrous on an equal scale. If we rise to the opportunity, there will be a huge increase in building, including the construction of other buildings as well as of houses, a great construction period lasting for ten years at least, which will sustain general business prosperity in this country during that time, in so far as general business depends on construction activity for its prosperity. Does this sound visionary? Well, I gave this statement together with many figures to that organ of conservative finance and economics, *The Wall Street Journal*, and the *Journal* printed them on its own editorial authority last June in two half-page articles on housing. In these articles housing economics—not

sociology—was considered. Of course, the facts and figures had been shown to various experts who had not differed from them. I did not picture in the columns of *The Wall Street Journal* the consequences to the building industry of failure. It may do no harm, however, to point them out here!

Of course, as everyone knows, the neglected majority of the population which the building industry fails to provide for does not go without homes. It still depends on the supply of old houses. These houses are obsolete, sub-standard in countless instances, and are in use, in a terrible state of depreciation, long after their normal "economic" life is ended. They are the slums which form blighted areas in our towns and cities, causing grave social and civic problems. All this, again, is well known, but what the building industry overlooks is the evil consequence to itself. The custom of using houses beyond the term of their economic lives clogs the real estate market with second-hand goods, slows down the normal rate of replacement, and impedes the efficient flow of building products from manufacturer to consumer. I use, of course, the example of the motor industry, whose extraordinary efficiency in supplying a good automobile to practically every family in the country, and whose huge profits made in the operation, should be models for the building industry. The point is, that if the motor industry has trouble with its "used-car" problem, it is nothing compared to the dilemma of the building industry with the "used-house" failure. Yet does the building industry really know that it has such a problem as the "used-house" on its hands?

But there are other evil effects on the building industry of its failure in housing. These may be more remote, perhaps, but they should arrive in due time. When one of the half-dozen or so of the basic industries of the United States fails to supply the public's needs, sooner or later the public brings that industry to book. The experience may not be pleasant,—for the industry. Need one do more than refer to a number of episodes in recent industrial history, namely, the difficulties of the railroads, banks and the industries of food products, coal, petroleum, and some others? There is something in the recent growth of "commission government" in this country which may concern the building industry, particularly in the founding of the Interstate Commerce Commission, the Federal Reserve Act, the Federal Trade Commission, and various other utilities, commissions, boards, etc., along with the various legislative acts which govern their work of supervision. Are all these government administrative bodies opposed by the businesses which they regulate? And were not practically all of them so opposed when they were first established? There is significance in these developments, particularly in respect to the 1926 New York State Housing Act.

The New York State Housing Act, designed to secure high-standard, low-cost housing, is the first of its kind. I believe that the building industry has nothing to fear from this law and others like it which may follow it in other states,—provided that the building industry coöperates. More of that later. But I do suggest that if the building industry does nothing to retrieve its failure to supply a basic need of the nation, building and real estate may suffer from many a government regulation and exaction which are harmful. Indeed, there are certain signs of public antagonism, stimulated by experts and influential citizens who have no connection with the building industry and who entertain little sympathy with it, but who are thoroughly informed as to its deficiencies. Thus the good will of the public for an industry,—that invaluable asset,—is being lost to building. The millions of dollars spent in advertising are not properly backed up in delivering the goods; probably the advertising of construction products would bring greater results if houses for everybody were produced as motor cars are produced. By contrast, the public loves the efficient motor industry, and will do anything for it, even to getting itself killed and maimed by thousands each year in order to provide room on the streets for the motor cars.

In this connection I think that Mr. Embury is unduly alarmed when he writes of "state aid." Indeed, he uses the term so loosely that I cannot quite grasp what he means. Strictly speaking, there is in the New York State Housing Act "state coöperation," but no "state aid" in the form of government subvention, no more than in the Federal Reserve Act, which Wall Street looks upon as one of the props of the financial universe. Possibly Mr. Embury refers to tax-exemption. Now, tax-exemption is an incident in housing, not a major feature. Besides, the tax-exemption provision in the New York law is carefully safeguarded. It rests with the municipality, and in New York the exemption is allowed for the purposes of replacing obsolete housing properties. Also, the exemption applies only to the new buildings to be erected on the sites, not to an entire housing investment. Consequently, its effect is to maintain the rate of taxes which were formerly paid on the site. But, in any case, whatever we think of the principle, there is nothing radical about it. It is sound American practice to grant a government subsidy in order to start a new essential industry when private enterprise has failed. What else were the federal grants of land to the railroads, given after the Civil War, made for the purpose of opening up the Far West? Since the World War the government has demonstrated the economic need of using the inland rivers for transportation by operating a large line, under Mr. Hoover's active sponsoring. Similarly, the government organized the air mail lines which are now being turned over to private companies. Lastly, there is the tariff, mother of many a lusty infant industry. Many of these steps, although supported in conservative circles, are more radical than the New York Housing Act. But if they are un-American,

then President Coolidge is the prophet of Lenin!

The principle to be deduced from these precedents appears to be that government may be expected to interfere in the American economic organization in order to establish a new industry or to reorganize an industry which is failing to live up to its responsibilities in coöperating with our industrial system, but that the government is ready to step out as soon as private enterprise in the industry is ready to function. I have steadily opposed the idea of "government housing," which is rife in housing circles, but I am not blind as to what is likely to happen if our industry remains inefficient in the housing field. A significant instance in this connection is the recent vote amending the New York State constitution, facilitating a municipality's use of land condemned for a public improvement (such as a traffic street widening) for housing. Actually, the amendment is a technical detail involving necessary legal powers in city planning. The question as to whether this power will be wisely used can be settled only in the future as specific projects are undertaken. But the point of the matter is that the people thought they were voting to order the slums cleared. Political placards urged votes "For Decent Housing," and newspapers carried headlines of "Slum Clearance Amendments." The amendment was carried by a large majority, reaching about 7 to 2 in this city. Such a vote is a temptation to a demagogue who sees an opportunity for making political capital. Housing is in politics now and is likely to stay. Let us take warning. If the building and real estate interests feel obliged to leave initiative in housing to the government, at least let them be ready to take housing back from the government as soon as possible.

I trust, if the building industry can view housing in this light as a practical economic opportunity and responsibility, which it owes to American industry, instead of as a strange sociological problem which can never be solved, that it will act to retrieve its failure. It is a mistake to view the problem in terms of history, quoting the example of ancient Rome and of most other great cities before and since, and ending by dismissing housing as hopeless. Our rival, the motor industry, made no such mistake. Fortunately for it, it deals with a product which has no history. Henry Ford, in fact, has declared that he does not believe in history! There was no precedent based on the experience of the Romans with motor cars to confuse Mr. Ford with notions that "it could not be done." Doubtless this freedom aided Mr. Ford in conceiving his crazy idea that practically every American family could own a decent automobile. Although he did not believe in history, he did in magic, and he was right!

Now, as a practical matter, what is the outlook for a solution of the housing problem today? Fortunately, I believe it correct to say that real progress has been made, both in estimating the extent of the work and in the experience which has been gained in actual housing operations—although, as I have already suggested, it would make no difference in the responsibility resting on the building industry if there were nothing hopeful to report in progress made. In the first place, there is the Metropolitan Life Insurance Company's housing in Queens, now entering its fifth year of successful operation. It rents for $9 a room a month with the aid of the first tax-exemption awarded in New York, or without benefit of exemption at the rate of about $10.50 a room a month, including steam heat, hot water and dumbwaiter service. The Metropolitan housing returns over 8 per cent net to the insurance company, for interest and amortization on—let this be emphasized—*a 100 per cent equity*. There are several other housing operations in New York, notably those of the Standard Oil and of the Rockefellers. They were built on a smaller scale than the Metropolitan, with the idea of demonstrating certain principles of housing technique rather than of attaining the low Metropolitan costs. Nevertheless, these other housing groups rent for considerably less than the market in their neighborhoods. These building are facts which the most prejudiced person cannot brush away. It seems reasonable to think that the solution of the housing problem depends in large measure on continuing to produce building groups like these of the Metropolitan Life Insurance Company and the others. This being true, it devolves on the building industry to show why it does not coöperate in this object. This appears to be the gist of the problem.

Why are not more housing operations like the Metropolitan groups built? "Because the speculative builder cannot make enough money out of it" is the answer. That may be the answer why the work is not undertaken, but it is no reason why the building industry should continue to throw up the task. If the work is too much for the speculative builder, let someone else be found to tackle it. Indeed, it is only fair to say that the methods of the speculative builder automatically rule him out of the picture. His methods were developed for another kind of houses,—the homes of the upper third of the population, the owners of the Rolls-Royces and the Buicks. They are impossible for Fords, and it is Fords we are now concerned with. The methods of the speculative builder for handling low-priced housing have been given the most thorough technical and scientific study as to their adaptability to housing, and nearly everyone who has studied housing is agreed on that point. The possible exception is the heads of the National Housing Association, who apparently differ in this view only to the extent of saying that the speculative builder should be depended on for housing, but they seem unable to advise him how he is to do the work. The fact is that the methods of the speculative builder are obsolete in a basic industry. The whole trend of American economic organization is in another direction. It lies toward huge-scale opera-

tions, efficiency, and a narrow margin of profit, but —and here is the point—*surer* profits, based on the elimination as far as possible of highly speculative risks. The fact is, that the same methods which are pursued by the speculative builder, if applied in other basic industries, would presently wreck the whole economic structure of the country.

Consequently it would seem as if a different type of organization, different particularly on the financial side, were needed in order to produce sufficient large-scale housing operations of the type of the Metropolitan Life Insurance Company and kindred enterprises—and much better operations as practice brings improvement—and thus end the housing problem for all but that extremely small number of people who cannot support themselves and who should rightfully be objects of charity. The New York State Housing Act was designed to facilitate this new type of housing corporation. And, be it noted, the law is just as helpful—and probably just as necessary—in the case of housing projected on the outskirts of cities, or in new industrial communities under a policy of decentralization, as it is in the congested areas in the hearts of great cities. For, generally speaking, the speculator is as unable to supply sound housing for even the middle third of the population on the outskirts of the city as he is at its center. This fact should not be overlooked, and I believe that Mr. Embury is in error in asserting that high wages in the building industry are the cause of the housing problem. I have taken part in countless calculations during the past year, as one of the consulting architects of the New York State Housing Board—long, accurate, painstaking studies—and know that the results of these researches bore out what had been fairly evident to housing architects,—that is, that high wages are not the cause of failure, except to a very limited degree. Of course, a reduction in wages would affect rentals, but not nearly so much as would the abolition of speculative finance. The Metropolitan's housing was built at the present wage level,—in fact, the construction operation was shut down for nearly a year because it could not afford to pay the wage bonuses then demanded. This delay increased the carrying charges. This leads me to agree with those architects who believe that capital and management in the building industry are in need of far greater improvement in methods than is labor.

Exhaustive research into land values, and into costs of various types of building construction, with reference to room sizes and specifications, studies of financial possibilities, including the tax factor and large scale operations with the amount of extra income to be derived from retail stores,—this the new Housing Board of New York found necessary before it could place before private building corporations the proper inducement to proceed to construct housing under the law. This research showed that there was a remarkable lack of accurate knowledge on certain phases of the subject. That criticism sometimes heard of the State Housing Board, namely that in a year it has "done no building," only indicates a superficial acquaintance with the matter on the part of the cynics. We must be patient. In my own opoinion, further research may be necessary, and may show that the law requires further amendment in certain of its provisions. This should not be wondered at, since the law is the first of its kind, and is necessarily experimental.

These are some of the vital facts in the housing problem today. Of course, there is much more to the story, which is one of amazing complexity, and never ends. But out of the welter of facts and conflicting views there stand out clearly the responsibility of the building industry and its duty to pursue the success of the first experimental housing groups. This means action, and action based on thorough knowledge. Knowledge can come only from scientific research, coupled with actual experience. Not only in housing but in other types of buildings, one vital need of the construction industry is scientific research into the economics of building design. We can hardly hope to play our part in the complex, technical, swiftly changing, industrial life of today unless we devote much more attention to research. Warnings have been issued by leaders in industry on the need of research. Examples have been given of huge American industries which have been ruined by changes which were never even thought of until they arrived. Scientific research would have discovered the possibility of these changes and found means to avert them or to cope with them, and so preserved the industry.

But, whatever be the solution, I hope that I have made clear my purpose of showing that the building industry will be held responsible for the failure in housing. Responsible business, financial and government authorities, as well as the public, will ask the building industry, why, if it is one of the nation's basic industries, it cannot do its part as the other basic industries do theirs, and supply efficiently the demand of a clear majority of the nation's 120,000,000 consumers. Either the building industry must tackle the task of providing housing seriously or else show, far more convincingly than it has ever done, that there is something inherent in its field, and different from other basic industries, which prevents it from following the modern economic trend. In either case the building industry faces the biggest task it has ever tackled. For the building industry, housing is not primarily philanthropy or sociology,—it is pure business.

In the providing of housing the architect must be active. The problem of design is uppermost in any angle of housing, and, in a long experience, I have seen almost no statistical study or research worth the paper it was written on which did not depend, in essentials, on an architect's counsel. Technically, the solution of housing depends on a scientific perfection of the "chemistry" of buildings, groups of buildings, and site areas, and is thus architectural in design.

OFFICE PRACTICE

SIMPLIFYING THE WRITING OF SPECIFICATIONS

BY
CHARLES E. KRAHMER
OF THE OFFICE OF GUILBERT & BETELLE, ARCHITECTS

DRAWINGS, specifications and contracts for a building are the tangible and concrete expressions of the development of an idea used to produce the structure desired in accordance with the building, business and legal practices of the community within which the building will be constructed. In the course of the development of the idea by the architect, it is interesting to note that the drawings in their various stages of development are prepared first. After the drawings are completed, the specifications are compiled. After an agreement is reached, based upon the drawings and specifications, the contracts are prepared. The contract is the written agreement to perform all of the work defined by the drawings and specifications, which when executed will legally compel one of the parties to complete all of the work shown on the drawings and covered in the specifications in return for the remuneration agreed upon.

Definition of Drawings. The drawings are prepared to illustrate those portions of the idea which it is impractical to convey by the use of the written word. Specifications are prepared to convey those portions of the idea which it is impractical to convey by the use of the drawings. Usage has within reasonable limits defined the function of each. The drawings should clearly and accurately indicate:

(*a*) The architectural and engineering design.
(*b*) The plan, sizes and dimensions of each portion and unit of the work.
(*c*) Designation of each portion, so as to allow reference to it.
(*d*) A symbolic sign illustrating the extent to which each of the building materials will be used (cross hatching, etc.).
(*e*) Notes:—These should be used carefully and sparingly and only as necessary to simplify the preparation of certain portions of the specifications and to clarify portions of the drawings which cannot otherwise be indicated. Notes can very easily be used to an extent where they are likely to contradict the specifications.

Definition of the Specifications. Specifications are designed to convey in writing that portion of the idea which it is impractical to convey by means of the drawings. The drawings and specifications complement each other. It is for this reason that the exact function of the specifications should be defined. The specifications should describe the organization, material and workmanship required from each and every unit, with a full understanding of the function of each, and in such a manner that in combination with the drawings, these several results will be obtained:

(*a*) An accurately detailed presentation of what is wanted.
(*b*) An instrument forming an accurate basis from which estimates can be obtained on each and every unit and forming a means of establishing a trade agreement.
(*c*) A document which, in combination with an executed contract, will legally compel the production of what was agreed upon.

The specifications should be designed keeping in mind that these different individuals are very much interested in each portion:

(*a*) *Supervisor of Construction.* This official is the "policeman" on the work. It is his duty to interpret and enforce all of the provisions of the specifications. He, therefore, should be backed with a definite, complete description of what is required, not be subject to contradition, and be forceful enough to support his decisions. The descriptions should be clear and accurate enough to prevent the necessity of having recourse to interpretations.

(*b*) *Estimator.* This individual desires a document accurately subdivided, with each trade inclusive, and prepared with an understanding of the market, and the trade and labor organizations in the community, to allow him to obtain accurate estimates for any portion of the work.

(*c*) *Materialman.* This functionary desires standard grading rules of materials and methods of construction, so that he can quote upon exactly what is wanted. The specification should be prepared so that special and unusual materials, difficult to obtain, are not required.

(*d*) *Contractor.* For success in his work he requires a safe, strong and sure basis, upon which to execute his various sub-contracts without fear of the necessity of paying extra for items in other portions of the specifications which should have been included under the proper trade designation.

(*e*) *Draftsman.* It is necessary that he have enough detail, definite data and names of materials, to intelligently check shop drawings and to prepare details.

The Precedence in Authority. The Supreme Court has ruled that where the contract documents contradict one another, the contract is impossible of execution and is, therefore, null and void. It is for this reason that contradictions between plans and specifications should be avoided and that one of the documents should take precedence over the other. The drawings are prepared first, after which specifications are compiled; then the trade agreement is made, and

the contract is prepared and executed. It is for this reason that the procedure is reversed in the matter of precedence, the contract taking precedence over the specifications, and the specifications taking precedence over the drawings. A statement to this effect should be included in the specifications and contracts.

Specification English. The question of the use of English should be carefully considered in the preparation of specifications, as the proper use of the moods and tenses, sentence construction, diction and grammar, should be such as to convey exactly the meaning intended. The American Institute of Architects uses the simple future tense of the imperative mood consistently. I believe this adaptation is correct, as it is undoubtedly the intention that the contractor shall furnish "such and such" materials or labor, for which the owner will pay "such and such sums of money," and will bind each other accordingly.

Division of Trades. Specialization with the building trades is highly developed and penetrates into each and every trade to an extent not dreamed of a generation ago. The list of trade sections of the New York Building Congress includes 56 different divisions, many of which are sub-divided within themselves, so that it is possible for 100 different subcontractors to be employed on one operation. The Building Trades Employers' Association of New York issues a handbook which lists the various awards made in jurisdictional disputes between the different labor unions. This handbook is a valuable guide to the scope of work performed by each trade, and it forms the basis for the inclusion of the materials and labor in their proper trade divisions. It is the architect's duty to evolve an efficient working plan, utilizing the various sub-divided trades as they are now organized to function. The only way by which this can be satisfactorily accomplished is by means of the specifications. First, by means of the General Conditions, the entire organization, method of control, scope of work and system of constructing the particular building are covered, after which the amount of work expected from the general contractor is clearly defined. Then the scope and class of work and quality of materials for each separate trade or trade division are clearly defined, without omission or overlapping. The trade divisions are listed in the sequence in which each individual trade performs its work upon the building. The list of trade sections of the New York Building Congress furnishes an ideal means of trade divisions for the Metropolitan district, but it may not apply in localities where the trades are not so intensively organized.

Sources of Information. The specification writer is in effect a clearing house for all information affecting building materials and their use. The scope of a modern specification prepared in one of the larger offices is beyond the experience and knowledge of any one person. Therefore, it is of the utmost importance that the specification writer discover and develop reliable, progressive, and authoritative sources of information. They may be roughly divided into these four parts:

(*a*) The individuals comprising the architect's organization.

(*b*) Contractors, sub-contractors, materialmen, material and labor associations.

(*c*) Catalogs and trade magazines.

(*d*) Personal visits to the work to obtain first-hand information.

The most reliable and often the most fertile field of information consists of the personnel of the architect's organization. The specification writer should make the proper contacts, so as to select those whose experience and knowledge are of value. The architectural designers should be familiar with the textural finishes of walls, woods, roofs, types and kinds of brick, stone, slate and wood of the various architectural periods; and should advise him of materials, colors and textures desired for the proper interpretation of the designs. The supervision department forms the "eyes" of the organization, and the specification writer should consult it at all times about the practical use of the materials specified and the subdivision of the trades. A close contact with the supervision department is of the utmost importance, as it is often called upon to interpret the meaning of the specifications. Another source of valuable information is found in the estimators, contractors, sub-contractors, and materialmen visiting the average office. It is wise to interview those who have serious business, and to appraise and classify those having the desirable character, contacts, training and experience. These men are able to lead one "back stage" to obtain a "close up" of the inside workings of the various trade, labor and material organizations which is invaluable. The contacts so developed create, in effect, an advisory board on the different phases of building construction which will enable one to obtain authoritative, reliable and valuable data on any subject. Salesmen who are merely "order takers" and "lip salesmen" are a nuisance, and no time should be wasted on them.

Another source of information, and one that is developing rapidly, is formed by the various material and trade associations, such as the Copper & Brass Research Association; the Portland Cement Association; the Common Brick Manufacturers' Association; American Face Brick Association; National Lumber Manufacturers' Association; American Institute of Steel Construction; the National Association of Ornamental Iron & Bronze Manufacturers; etc. These associations are created to develop and extend the use of the products or trades they represent, and are in a position to furnish accurate, scientific and common-sense data on all questions relating to their trades or products. The Bureau of Standards of the Department of Commerce has touched on many questions affecting the specification writer. For instance, their pamphlet No. 123 covering the physical and chemical tests of the commercial marble of the United States; the circular No.

NEW YORK BUILDING CONGRESS

List of Trade Sections for Specifications

1. SPECIAL CONDITIONS: (Conditions, not actual work).
3. MISCELLANEOUS WORK: (Items of actual work to be done).
5. DEMOLITION:
7. EXCAVATION:
   Filling, Grading.
9. PILING:
11. SHORING:
    Sheet Piling, Underpinning.
13. FOUNDATIONS:
15. STRUCTURAL STEEL:
17. WATERPROOFING BY PLASTIC COATING:
19. WATERPROOFING BY BITUMINOUS MEMBRANE:
21. MASONRY AND CONCRETE MATERIALS:
    Cement and other basic materials, Integral Waterproofing.
23. MASONRY WORK:
    Mortar, Brickwork, Rough Stone Masonry, Structural Terra Cotta, Gypsum Blocks.
25. MASS AND REINFORCED CONCRETE:
27. CONCRETE ARCHES AND FIREPROOFING:
    Reinforced Concrete Stairs, Hangers.
29. CUT STONE WORK: (Granite and Bluestone should generally be separate).
    Stone Models, Carving.
31. IMITATION CUT STONE:
33. ARCHITECTURAL TERRA COTTA:
35. ROOFING AND SHEET METAL:
    Skylights and their Glass.
37. VAULT LIGHTS:
39. ARCHITECTURAL IRON:
41. ARCHITECTURAL BRONZE:
43. CEMENT FINISH:
45. SPECIAL PAVING:
    Asphalt, Wood Block, Stone.
47. SPECIAL FLOORS:
    Cork, Rubber, Mastic, Magnesite, Linoleum.
49. METAL FURRING AND LATHING:
    Metal Beads.
51. PLASTERING:
    Keene Cement, Stucco, Sgraffito, Wood Lathing.
53. ACOUSTIC TREATMENT:
55. INTERIOR MARBLE AND SLATE:
    Structural Glass.
57. IMITATION MARBLE:
59. TERRAZZO:
    Marble Mosaic.
61. TILE:
63. CARPENTRY:
    Framing, Millwork, Screens, Weather Strips, Rough Hardware.
65. SPECIAL WINDOWS:
    Rolled Metal, Hollow Metal, Patented Operation.
67. HOLLOW METAL DOORS AND TRIM:
69. METAL COVERED DOORS AND TRIM:
71. SPECIAL DOORS:
    Revolving, Balanced, Folding, Rolling Shutters.
73. SHOW WINDOWS:
75. HARDWARE:
77. GLAZING:
79. MAIL CHUTE:
81. PAINTING:
    Wall coverings.
83. DECORATIONS:
85. PLUMBING:
    Gas Fitting, Fire Lines.
87. SPRINKLER SYSTEM:
89. VACUUM CLEANING SYSTEM:
91. REFRIGERATION SYSTEM:
93. WATER SUPPLY SYSTEM:
95. SEWAGE DISPOSAL SYSTEM:
97. HEATING AND VENTILATING:
    Temperature Control.
99. POWER PLANT:
    Coal and Ash Handling, Cranes, Engines, Dynamos.
101. ELECTRIC WIRING:
     Signal Systems, Bells, Telephones.
103. LIGHTING FIXTURES:
105. FIRE ALARM SYSTEM:
107. CLOCK SYSTEM:
109. ELEVATORS:
     Power Dumbwaiters, Elevator Accessories.
111. ESCALATORS:
113. MECHANICAL CONVEYORS:
     Pneumatic Tubes, Chutes.
115. EQUIPMENT: (Semi-independent: This list may be extended indefinitely):
     Kitchen, Laundry and Garage Fittings, Safes and Vaults, Furnishings, Tower Clocks, Chimes, Bells, Greenhouses, Landscape Work.

151 on "Wall Plaster, Its Ingredients, Preparation & Properties," and the booklet on the "Minimum Requirements for Small House Construction," are useful, and the information contained is gathered from the most authoritative sources. When catalogs are received they are quickly appraised and turned over to the catalog file. Those having desirable specification data are culled out, and the specification data extracted and filed in a separate system.

Filing Specification Data. A satisfactory method of filing basic specification data is by the use of stiff covered loose-leaf binders, 8½ x 11 inches, with 1½-inch rings. These binders contain numbered indices using the corresponding numbers that the New York Building Congress utilizes for its trade sections, or the divisions determined by a similar local body. The printed form of the New York Building Congress forms the index for these bindings in this case. A copy of this printed form is shown on page 139. When desirable specification data are obtained, the trade designation is obtained from the index, and the data filed under the number assigned to it. This system allows the gradual accumulation and selection of important data, so that a complete reference library in loose-leaf form is acquired. These volumes are numbered and kept in a standard bookcase for constant reference and form in no sense a catalog file but contain basic specification data that are constantly referred to in the preparation of specifications.

Systems of Compiling Specifications. To eliminate the repetition of mistakes which occur in copying one specification from another, and the inclusion of data which would not apply to another, the "master specification" was developed. These specifications also are designed to simplify the compiling of new specifications and to standardize the general construction practices of an organization. It will readily be seen that where an office works from a master specification, the various supervisors, detailers and contractors' estimators become familiar with the type and class of work specified. This knowledge will not only speed up and simplify work, but will eliminate a good many errors. The interpretation of the specifications gradually becomes standardized, and the various contractors can tell from past decisions what to expect. The advantages of a master specification are its being:

(*a*) A check to prevent omissions.
(*b*) A source of ready reference.
(*c*) Means of recording the best experience.
(*d*) A place where corrections can be made and repetitions of errors avoided.
(*e*) A source whereby constant improvements can be made, keeping abreast of the times.

There are various methods used in compiling specifications. The three outstanding methods are:

(*a*) *Use of Old Specifications.* This method consists of the use of an old specification of a similar work as a basis. Starting with the "General Conditions," the paragraphs that apply to the new work are cut out and pasted in their proper sequence on a standard yellow pad. Where a paragraph does not apply, insertions in longhand are made directly on the pad so that a complete specification is had on yellow paper, consisting of paragraphs pasted on the paper, with insertions in longhand. These are then turned over to the stenographer who makes a rough copy, using double or triple spacing to allow inser-

SERVICE CONNECTIONS: ELECTRICAL WORK - THREE-3

Service Conduits and Feeders:

The Electrical Contractor shall install the lighting (x) and power (x) conduit_ and feeders from service cutouts in building to point of service

(a) connections on_____, the conduit_ to be extended up the

(a) _____ not less than 15 feet and_____

to terminate in an approved waterproof conduit drop loop bushing as required by the Service Company. The feeders shall be as specified under "Wiring" and sufficient length of cable shall be left at each end as required.

a-For overhead service specify: side of building.

" underground " " company's pole.

(x) indicates possible omissions.

Sample Card from a Card Index Master Specification
(Actual card is 5 x 8 inches)

tions, additions or changes. This "dummy copy" is then used for checking, and when complete is delivered to the stenographer for final typing. A development of this method is to paste the paragraphs which apply on the pad as just described, and where insertions occur a few notes are made. The subject matter is then dictated directly to the stenographer, who inserts the paragraphs in the proper spaces. Most of the trouble and dissatisfaction with architects' specifications can be traced to use of this method. The reason is, in choosing a specification which parallels that being written, one may be chosen that is from five to ten years old. The mistakes and vague and meaningless paragraphs will be continued, and frequently practices and materials that are out of date and off the market for years will be specified.

(*b*) *Card System.* The card index master specification generally consists of cards about 5 x 8 inches in size, filed in a standard draw file. A sample card is shown on page 140. These cards are filed in rotation according to the trade divisions used in the office in which the specification is being compiled, which should, of course, coincide with the practice in the community in which the work will be done. One subject is assigned to each card, and where the subject is too long for one card, the subject matter is continued on the opposite side, or sometimes two or three cards are used for one subject. The stenographer then copies the cards in their proper rotation, compiling a "dummy specification," using double or triple spacing for ease in making corrections. The "dummy" is used for carefully checking and correcting the work, and after this is completed it is turned over to the stenographer for final copying. The cards are then sorted. This is generally done by the stenographer, who makes the necessary erasures, cleans up the cards, and files them, so that they are ready for use again. The danger in this system is the tendency to put too much in the specification and to become too general in application. There is also danger of accumulating unnecessary data. Clauses are often put in a standard file which are used so rarely that they should be discarded. The file should be kept up to date. When this is done, the system is excellent and will well warrant the trouble and expense of installing and maintaining it.

(*c*) *Standard Sheet.* Realizing the shortcomings and limitations of the use of an old specification and the card index system, there has been developed what might be termed a combination of the two, and where an office specializes in one class of work, it is a simple and economical system to use. The system consists generally of taking those sections of the specifications which are easy to standardize, such as, structural steel, brickwork, reinforced concrete, cut stone, metal furring, lathing, plastering, cement floors, terrazzo floors, interior marble work, tiling, hardware, linoleum, etc., and preparing master specifications for them. These are mimeographed on thin paper similar to specification paper, 100 copies being obtained for each section. The system then followed is to take these sections in their proper sequence and to utilize an old specification of a similar work as a guide, to work from the standard sheets, and compile the new specification as noted under the system for "Old Specifications." It has been found that by this system at least 40 per cent of the typing is eliminated. The "dummy specification" is completely discarded, the final copies being made at once, and portions re-written where necessary.

Those sections which are not susceptible of standardization are copied directly from an old specification, with the necessary new paragraphs dictated to make them apply. In many cases complete trade sections have to be dictated. With care, the subject matter can be segregated so that certain paragraphs will be standard and will not change. The subject matter which does change can be segregated on one or more pages, making it necessary to re-type only these pages. I believe this to be an ideal system, as the master specifications are being continually checked up and revised, so that there eventually is developed a master specification which fits one's particular practice and method of doing business. This system allows a gradual and continual development, cuts down typing expense at least 40 per cent, and forms a standard from which everybody in the organization works. Of course in all practices there will be operations for which this standard cannot be used. In that case, recourse is had to the old method of cutting and pasting the specifications; but wherever possible this is done by using the paragraphs from the standards rather than from an obsolete specification.

Specification Schedules. Where a building operation is very complicated, and where individual treatment of different rooms and spaces throughout the building is such as to make descriptive matter difficult, schedules are used. These schedules simplify the preparation of specifications and drawings. The system is generally operated in this way: Schedules are made of all rooms and spaces throughout the building. Schedules are made of all doors and door openings. Each door or door opening is numbered on the plans, and each room or space in the building is also numbered, the corresponding numbers appearing on the schedule. The schedule of door openings lists this information: 1. Size of Door, then, in order the type and kind of;—2. Door Buck; 3. Door Frame; 4. Door; 5. Trim; 6. Plinth; 7. Door Saddles; 8. Glass; 9. Transom; 10. Hardware. The schedule of finishes, lists: 1. Flooring, then, in order, the type and kind of;—2. Walls; 3. Base; 4. Ceilings; 5. Wainscots; 6. Chair Rails; 7. Picture Mouldings; 8. Number of special detail drawings.

The specifications applying to the use of the materials covered in the schedules could very easily be standardized, as no description of where the different materials occur is necessary, since the schedules determine exactly where use of all of the finishes occurs. This system simplifies the preparation of the drawings that make it unnecessary to mark the

finishes on the plans. It also makes it unnecessary to note on the drawings any data in connection with the doors. The schedules are prepared first, and after the schedules are compiled the specifications are prepared. Portions of two such mimeographed schedules are shown on pages 142 and 143.

"Snake." Before the preparation of specifications, a considerable number of notes are made. To keep these notes in order and to have them at the proper time and in sequence, it is customary in some offices to use what is known as a "snake." This consists of a number of sheets of yellow paper clipped together at the top, cut out at the edge and with each sheet indexed for the proper trade sub-division. During the progress of the work, notes referring to each trade are jotted down in their proper trade divisions. Sketches also are made where necessary, illustrating certain portions, so that a complete series of notes referring to each trade is covered on this pad. The "snake" is one of the most important means of obtaining an accurate specification, and its use is one of the best forms of insurance against "extras." It divides all of the notations into their proper trade headings and places them before one at the desired time and in the correct sequence. Even for the expert specification writer, I believe the "snake" important, and it should always be used before compiling the specifications.

Reproduction. The generally accepted methods of reproducing specifications are:

(*a*) *Carbon Copies.* Where only 15 or 16 sets of a specification are required, it is practical to obtain this number by typing the specification twice, using seven carbons for each typing. By this method it is necessary to use a very thin onion-skin paper, and if the typist is not accurate, a great deal of time is consumed in making corrections, for whenever an error is made it takes considerable time to correct each carbon copy. Of course, the last two or three carbons will be rather indistinct, and the carbon copies are easily smudged in handling. There is very little expense in doing the work by this method.

(*b*) *Blue Printing.* When upwards of 30 sets of specifications are required for each work, the most economical and satisfactory method is to use the blue-printing system. Blue-prints can be obtained for about 4 cents a sheet. They form a perfect record of the original specification, and cannot be tampered with. A blue-print specification can generally be obtained on comparatively short notice.

(*c*) *Gelatine Process.* On short specifications, where a small number of copies, perhaps 30 or 40, are required, this process would be feasible either for reproducing the specification within the architect's office or by a public shop, although in the smaller cities there are seldom any letter shops which employ this process. With this process, the original is typed on a typewriter through a specially inked ribbon, use of which is a part of the process. The master copy is made this way and is then transferred to the flat bed of the machine. The surface of the machine must be sponged before taking off each copy, and each sheet of paper must be laid in exact position, and then a roller is run over the sheet, after which it is allowed to stand for an instant, and then the sheet is taken up and another put in its place.

(*d*) *Type Printing.* It is too expensive to print a specification with type where only 50 or 75 copies are required. If they were to be printed, type about the size of newspaper type could be used, and two sheets, of single-spaced copy could be condensed into one. The cost of printing 50 or 75 sets of these specifications would be approximately $4 a page of the printed copy, which would equal $2 per

SCHEDULE OF DOOR OPENINGS — COURT HOUSE — SHEET NO. 1

SUBJECT			BUCK		FRAME		TRIM		DOOR		PLINTH		SADDLE		TRANSOM		DOOR GLASS			TRANSOM GLASS
Page of Specification			75	40	74	61	76	61	78	62	50	80	51	81	83		90	91		90
OPERATION FIRST FLOOR PLAN			WOOD	STEEL	OAK	HOLLOW METAL	OAK	HOLLOW METAL	OAK	HOLLOW METAL	MARBLE	WOOD	MARBLE	WOOD	WOOD	BRONZE	POLISHED PLATE	GROUND GLASS		POLISHED PLATE
Location	No.	Size																		
Court #107	150	3' x 7'	X		X		X		X			X		X	X		X			X
Jury #108	151	3' x 7'	X		X		X		X			X		X	X		X			X
Clerk #109	152	3' x 7'	X		X		X		X			X		X	X		X			X
Vault #110	153	3' x 7'	SPECIAL SEE PAGE # 120																	
Corridor	154	5' x 8'		X		X		X		X	X		X				X			
Rotunda	155	7' x10'		X		X		X		X	X		X							

Portion of a Specification Schedule; Door Openings

(Actual schedule is standard letter size)

page of the typewritten copy. It would ordinarily require one week to turn out a set of 200 pages. On re-runs for additional copies, the cost of printing would be about 50 cents a page. The disadvantage of printing is that cost is excessive and almost prohibitive when fewer than 50 copies are needed.

(*e*) *Mimeographing.* The use of the mimeograph process is a feasible method of duplicating the architect's specifications in the architect's own office, when 15 or more copies are required. In order for the architect to handle this work within his own office. it would either require additional employes or considerable overtime work. To mimeograph specifications within the architect's office would also require supervision to insure that the process was used correctly. To have specifications mimeographed by a public mimeographing shop, the cost becomes more of a factor. When between 30 and 40 sets are required, the cost of mimeographing would approximate the cost of blue-printing. Below 30 sets, the cost of mimeographing would exceed that of blue-printing, but the finished mimeographed sheets would have certain advantages over blue-printing which would be of value. The mimeographed set would be more compact and more readable. The chief advantages of blue-printing would be absolute accuracy, whereas, with mimeographing the accuracy is dependent upon the concern which does the work. Of course the stencil may be typed in the architect's office to insure accuracy. The typist who types the stencil must be accurate, and their checkers must catch such mistakes as are made. With blue-printing there is also the advantage that a few complete sets can be obtained in a very short time after the blue-printer has received the copy, whereas, with mimeographing, no sets can be obtained until the entire work is completed. When a stencil is once put on a mimeograph machine, the entire number of copies must be run off. When these specifications are sent to a mimeograph shop, approximately a day to every 100 pages of copy must be allowed. For instance, on a 200-page specification, the architect can expect to receive the completed sets two days after the mimeographer has received the original. When more than 40 sets are required, the saving in cost by using the mimeograph process increases in direct ratio to the number of sets required, since it costs very little to run 25 additional copies when a stencil is once put on a machine, whereas, the cost of each individual blue-print remains constant.

Summary. Too much system can be used in compiling specifications. The method should come naturally, for if forced into an ironbound system, the specification writer is likely to concentrate on the method and not on the subject. The methods outlined here should be used with great caution and judgment, as they often will not apply to unusual work. No substitute exists for a thorough knowledge of the subject, and no standard will take the place of an experienced specification writer. Specifications have been referred to jokingly as "the best sellers." Considering the number of people and the organizations affected by good specifications, it should not be difficult to realize the creditable publicity which will accrue as a result of having them. Among the most important assets of a specification writer are common sense and ability not to be swayed too much either way, nor to take sides too strongly. He should keep a perfect balance and attempt to get the proper perspective so as to obtain a proper view of the whole project. It is well to remember that behind the materials stand the organizations that produce

SCHEDULE OF FINISHES — COURT HOUSE — SHEET NO. 2

SUBJECT		FLOOR			WALL			CEILING			BASE			WAINSCOT			CHAIR RAIL	PICTURE MOULDING	DET. NO.
Page of Specification		40	60	70	31	41	80	79	80		40	26	90	41	26	92	93	94	
OPERATION FIRST FLOOR PLAN Location		MARBLE	TILE	LINOLEUM TILE	PLASTER	MARBLE	PLASTER BORNICE	METAL FURRED & LATHED	PLASTER		MARBLE	CEMENT	OAK	MARBLE	TILE	OAK	OAK	OAK	
Entrance Hall	#101	X				X	X	X	X		X								20
Toilet	102		X		X			X	X						X				
Passage	103			X	X				X			X							
Office	104			X	X												X		
Judge's Room	105			X	X		X	X	X		X					X		X	20
Court Room	106			X	X		X	X	X		X			X					
Jury Room	107			X	X			X	X		X						X	X	
Stenographers	108			X	X			X	X		X						X	X	
Sheriff's Office	109			X	X		X	X	X		X					X		X	25

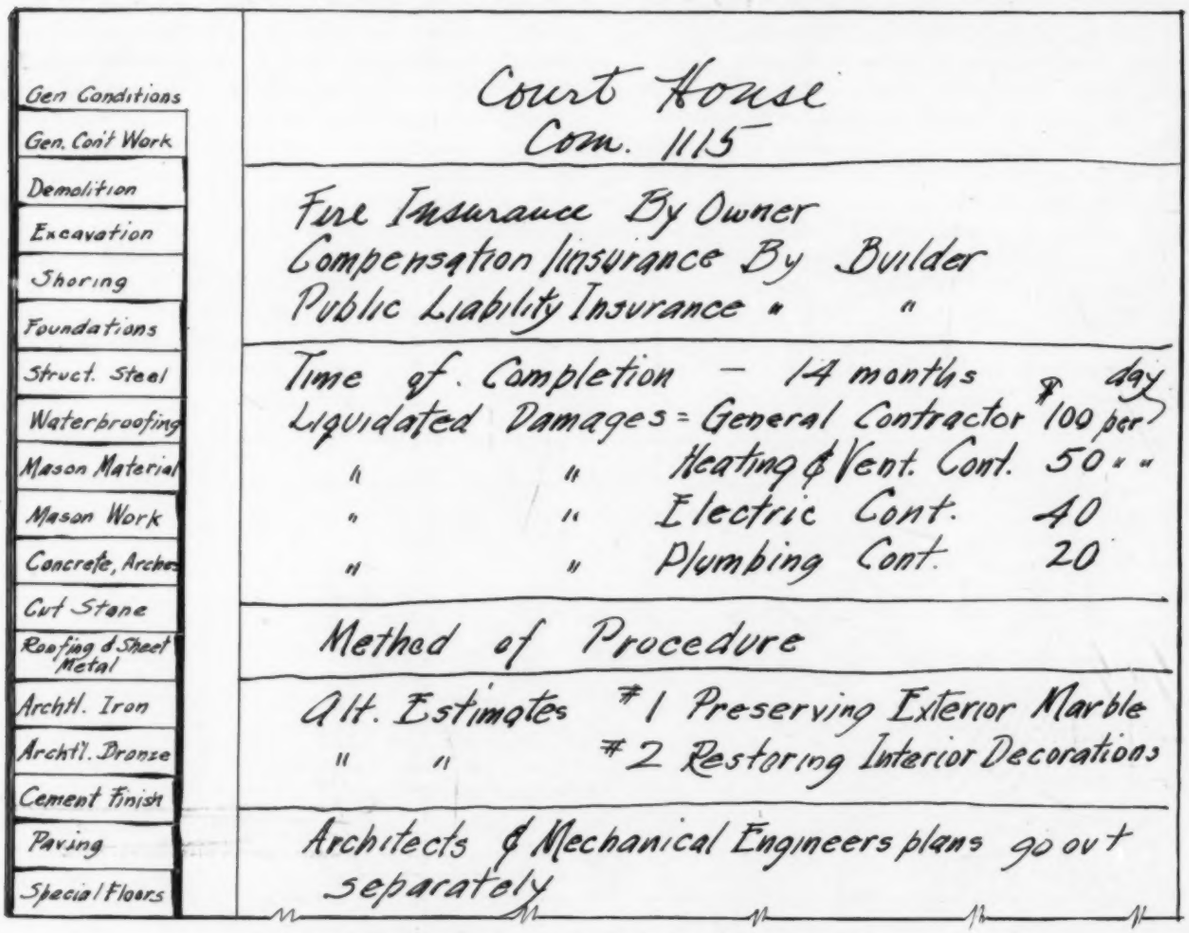
Portion of a Specification Schedule; Finishes

(Conforming in size to specification sheets)

them, so that when one selects a material one selects the company which will manufacture and install the material. It is for this reason that it is wise to make contacts with responsible companies and specify their products outright, without "or equal." By this method a skeleton organization will be "built up," which will strive to supply the material specified. The morale of the entire building operation will be affected, and a good building will result despite the whims of the general contractor. "Or equal" has a legitimate use, particularly when one is specifying raw materials covered by standard grading rules, because anyone interfering with competitive business is running counter to the business trend.

The materials that enter into a building may be classified generally under two headings,—raw materials, and manufactured materials. Raw materials in general comprise those products created by nature and used in the condition in which they are taken from nature. These materials are generally wood; stone; and such basic manufactured material as steel, copper, cement, lead, tin, etc., which are included under this heading for the reason that their quality is stabilized and standardized, due to the resources, equipment and finances backing them. Manufactured materials are generally paints; varnishes; waterproofing compounds; pitches; magnesite, mastic, rubber tile and similar floor coverings; chemical floor hardeners; cement products; electric clock systems; telephones; fire alarms; heating specialties; ventilating fans; thermostatic heat control; elevators, etc.

When specifying raw materials there is little need for looking behind the product, as the specification writer should be thoroughly familiar with them, and his training should qualify him to pass on these materials. He should know their grades, physical properties, adaptability, limitations, and costs. When specifying manufactured materials a different condition exists, as the specification writer must depend in large measure on the character and standing of the company behind the product, as these materials are generally as good "as the man who makes them." The human element enters into the quality of these materials to such an extent that the standing of the company behind the product is an all-important question to decide; the quality of the material itself very often depends entirely on this decision. The specification writer must learn what trade-marks mean.

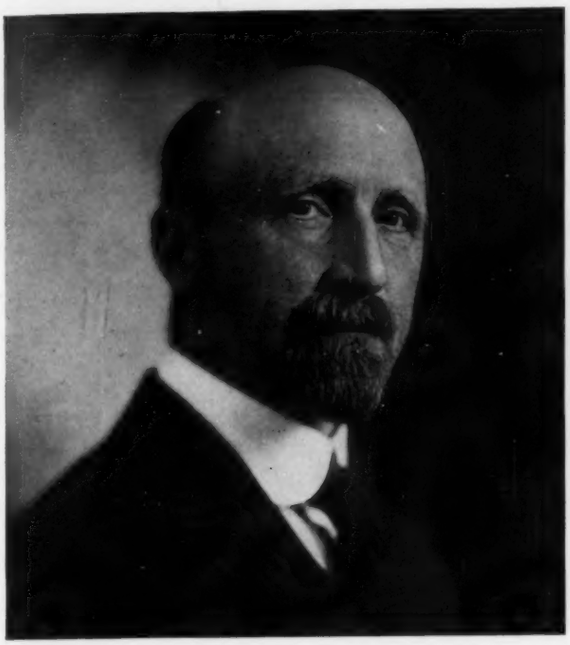


Facsimile of a Portion of the "Snake" Used by the Author

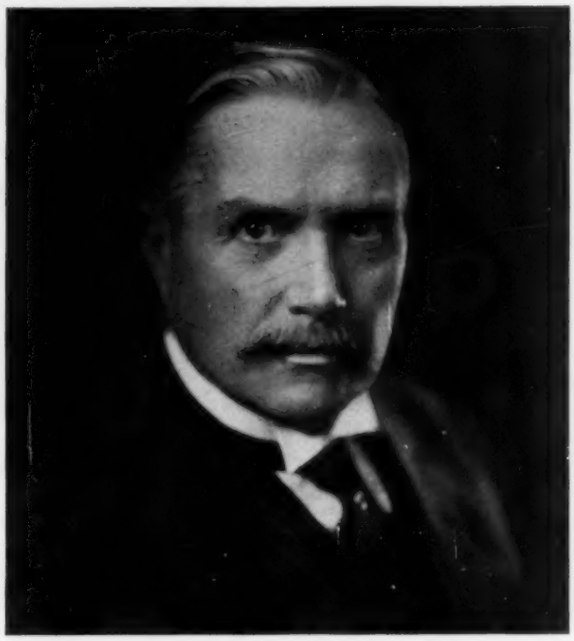
The original is a yellow pad 8½ x 11 inches; indexes corresponding to Trade Sections are cut at the left. The architect can make his notes directly on the "snake" and can correct them before the specification writer compiles the specification. The method saves time and makes it unnecessary to read the entire specification.

ARCHITECTURAL BIOGRAPHIES

JOHN PARKINSON: JOHN C. AUSTIN



John Parkinson



John C. Austin

JOHN PARKINSON is my friend, and the friendship is of long standing,—over 30 years in fact. We both came to Los Angeles in 1893, he as a practicing architect and I as a draftsman. John Parkinson left England for Canada when he was about 20 years of age, and from there drifted to Napa, in California. After a short sojourn in Napa, he went to Seattle. He stayed in Seattle for a few years and made quite a success, not only as an architect but as a financier. However, as with all other booms, Seattle's day of reckoning arrived. He therefore decided to try Los Angeles, and when he came with his wife and two small children, he had a capital of $50. He designed the first structure having a steel frame in southern California, and has designed some of the largest and most important buildings here. He has a happy faculty of making good and lasting friends. He is a student, traveler, engineer, and architect. He is known far and wide for his sterling integrity and unflinching fairness in the execution of his business. John Parkinson has two aberrations, one being that he thinks he can play pool, the other being that he has the hope of becoming a golf champion. He has been actively identified with a good many civic activities. For a number of years, he was a member of the Municipal Art Commission, and he is still a member of the State Architectural Examining and Licensing Board. His son, Donald B. Parkinson, is a member of the firm, and they make a splendid team, one with his ripe experience, and the other with the enthusiasm of youth.—JOHN C. AUSTIN

IN March, 1894 I opened an office in Los Angeles. Its equipment comprised a drawing table, T-square, etc., a set of instruments of 14 years service, and about ten yards of brown detail paper whose surface was untouched but alert.

Minus commissions, prospects or capital, with pencil in hand, I stood behind the table, when in through the open door quietly walked John C. Austin, seeking work. I liked his looks,—a square face; firm mouth and good jaw; gray, intelligent eyes in which a twinkle hovered,—a man to hold his ground and fight fair, asking nothing but opportunity, and, I was to learn, a man of wit, courage and staying qualities, then about 25 years of age.

In 1894 he opened an office, and since then many of the prominent school buildings of southern California, among them the Los Angeles High, many office buildings, hotels, hospitals and churches, are of his work. He has a positive genius for handling church, school and hospital boards, and unfailingly inspires and retains the confidence of his patrons. He is a prominent member of the Chamber of Commerce; has served as president of the Jonathan Club and of the Los Angeles Chapter of the American Institute of Architects. At the present time Mr. Austin is associate architect of the Los Angeles City Hall, to date the city's most notable building. As an architect, a man, and for his record, he has my admiration and esteem, and I have valued his friendship always, since as a lonesome English lad, 33 years ago, he asked me for work.—JOHN PARKINSON

TIME SAVING IN THE OFFICE

BY

E. R. DUCKERING

OF THE OFFICE OF WILLIAM LAWRENCE BOTTOMLEY, ARCHITECT

THE title may suggest an attempt to squeeze a few more lines and erasures from a man trying to puzzle out a thumb-nail sketch of the entire results of a conference between his employer and the client. However, the writer is only offering a hint or two that may release a few drafting hours which are spent in unnecessary waiting and interruptions due to lack of readily accessible information.

A commission usually starts with an indefinite collection of data presented in such odd forms as illustrations scribbled on a hotel paper napkin, the obvious results of a luncheon hour conference, or even on a paper bag or the flap of an old envelope. Very often a client will rush in a batch of magazine clippings carefully selected by him to fit into your idea of just what his house should be. Few draftsmen take these clippings seriously, and soon they are tacked up on a table leg where the janitor can pick them off easily. Later on the client remembers these precious documents and demands their immediate return. No draftsman can remember ever having seen them, and the architect is forced to appease his client as best he can. This is a serious reflection upon the office, and it is easy to avoid by no extra effort. Criticism in the form of sketches by the architect or any chief should be kept where it can be produced readily. An idea of the expense of keeping a person waiting for data can be obtained by figuring the rate per hour and finding the exact cost of the moments wasted in useless hunting. If several officials are kept idle for only a short time, the amount involved is appalling. In one week a serious of these retards will make a sum no one would fail to notice. A draftsman is often called upon to explain the origin of certain parts of his drawing which are only his interpretations of his chief's sketch. The boss calls immediately for the sketch, but it can rarely be found, and the crestfallen draftsman has only to listen to a lengthy description of his talents in interpreting the sketch into so unbelievable a monstrosity. Being unable to produce the original sketch, he has no defensive argument to offer.

To have a system whereby any scrap of information relative to a commission, whether it be note book references, photographs, or clippings, can be readily produced, is a time-saver for all. It will also relieve the air of a certain static in the form of a nervous tension which exists while the office boy is frantically trying to recollect where he last saw the drawing that is demanded. A legal size manila envelope affords a practical place to store all these bits of information. The envelope presents a neat appearance, and a collection of such envelopes can be filed in alphabetical order or kept in a tracing drawer. The vertical file is most satisfactory because it keeps all the envelopes together. Mental peace of the force makes for a smooth continuance of work. A telephone call or discussion within earshot naturally tends to distract anyone who is in a mood for concentration. Arguments invariably disrupt the work of a man who is checking a set of figures. It is apparent that a drafting room free from searching parties, contractors seeking suitable reasons for extras, and others endeavoring to have drawings put into their own language is a place in which those who do feel inclined to concentrate can do so. It is not intended to condemn practical joking, for jokes do not constitute the lasting barrier to thought that an uneasy mental atmosphere engenders.

A great deal of time is spent in making details that cover either a large number of conditions or else a very few. Most offices give each drawing a number and a title that is fairly descriptive of what it is supposed to include. Rarely can one determine from the title all that the drawing covers. A very simple method for saving extra drawing and permitting the contractor to choose the correct detail with the minimum amount of effort is to put on the working drawings the number of the detail covering that particular section or condition. Certainly a drawing or sheet number is as easy to read as are quantities of notes, such as "see F. S. D." or any reference to another sheet. The existence of the number alone is sufficient to explain whether or not the condition is covered in a scale detail or a full-size, or perhaps in both. If a condition requiring a detail has no number, it has been detailed. Every drawing number should be recorded on the office copy of a set of working drawings as it is made. This forms a check on the progress of the detailing, and any person can soon establish the status of the work. Many contractors use this system of numbering on work as it is in progress, and it is quite as advantageous to a drafting room in saving hours of time spent looking for the number of the drawing covering a certain condition. Windows and doors have their numbers to make them easy to list and locate, and application of the same principle can be made to a uniform listing of drawings for anyone to read. A drafting room's set of estimate drawings will serve as a telltale record of exactly what the contractor figured on. This should be kept meticulously. When the results of several extensive erasures have cleared the ground for new ideas and corrections on the tracings, the original records will still be intact. Such records are often worth while if a lawsuit is threatened.

ARCHITECTURAL LAW

THE STANDARDIZING OF BUILDING CODES

BY
RUDOLPH P. MILLER
Consulting Engineer; Author of New York Building Code

WITH a growing consciousness in the public mind in recent years of increasing health hazards due to the housing shortage caused by the World War, and the greater fire hazards, frequently involving loss of life, due to greater congestion incident to a rapid development of urban districts, there has come a realization of the need of better regulation of building construction in the interest of public safety, health and general welfare. Over 100 municipalities of 10,000 or more inhabitants are at the present time revising their existing building codes, and more than a score of others report that they have such work in contemplation. The great activity in the zoning movement developed within a decade has, no doubt, greatly stimulated interest in better planning and construction of buildings, these two means of regulation being so intimately related that they really should be dealt with as one matter.

Every municipality, certainly when it has become an aggregation of 5,000 inhabitants or has become an active industrial center of even lesser population, should exercise some control over the erection of structures within its boundaries. The right of the individual to protection against deprivation of light and air by an unnecessarily full development of his neighbor's property, and against the fire hazard created by the unwarrantable use of combustible materials in construction, to mention only the two chief dangers arising from intensive development of land, should be properly safeguarded. But what of existing building codes? Is there any need of changing these? If they are ten or more years old, it can be safely asserted that they are in the main obsolete or, at any rate, inadequate. In recent years there has been extensive research, not only in connection with the development of new materials for building, but also with respect to the physical properties of old, well tried materials. The growing use of the former has forced a re-study of the latter to avoid complete replacement. Then, too, improvements calling for recognition have been made in methods of construction; better planning has been more or less retarded because of restricted requirements; greater differentiation in specific provisions seems desirable for varying conditions of occupancy. The chances are that any building code more than ten years old makes no provision for these developments.

The Old Code as a Specification

The old codes have been referred to as inadequate. That is not to be understood as meaning that they are not sufficiently detailed. The probabilities are that with respect to the matters dealt with, they go too much into detail. Their requirements generally are in the nature of specifications. If adhered to they leave no way open for a different, even if a perfectly safe, way of accomplishing the desired result. This tendency to make specifications of the codes still prevails. Existing codes are being amended to provide for use of new materials and new forms of construction by adding detailed descriptions of the materials and elaborate instructions for their use. As a result, such codes are becoming encyclopædias of building construction as practiced at the time of their adoption in the particular localities to which they apply. There are building officials who are advocating this type of a building code. They look to it as a *vade mecum* in which they expect to find the exact answer to each question as it presents itself. When the code fails to provide for a given condition, it means to them a prohibition of that proposition. So, too, there are architects who desire this type of building code. To them it serves as a text book from which they draw material for specifications and even the basis of their designs.

But the specification type of code has marked disadvantages, the chief of which is that it hampers development. With all requirements specific in their nature, practically fixing all details of plan and construction, little freedom and no incentive are left the designer to improve on the standards that are the result of the fixed requirements. Use of new materials or modes of construction is discouraged. Revisions and amendments can, of course, be made, but when these involve legislative action, the time lost will frequently cause the abandonment of the intended improvement or deprive an intending user of a new material or benefit of an economy that might be effected. The specification code also tends to creating indifference on the part of the architect, contractor and administrative official. With everything prescribed, or rather assumed to be prescribed, there seems to be no need for use of special intelligence in the application of the statutory provisions.

The Real Purpose of Codes

It is not contended that all the provisions of a building code can be general in character, but restraint should be as limited as is possible consistent with the protection necessary for the public. So far as practicable, depending on the facilities for accomplishment, the code should prescribe conditions of safety to be secured without fixing a specific method by which they are to be had. This is quite possible in those matters where quality of materials is standardized or where construction practices are well established. The quality of practically all of our building materials is fixed by standard specifications prepared with great care after thorough research by committees of national scope and competent personnel, such as the committees of the American Society for Testing Materials and the National Fire Protection Association. Construction practices too have received general recognition;

among them is the specification for steel construction promulgated by the American Institute of Steel Construction. There is therefore no real necessity for incorporating in a code these details that are so well known. The futility of endeavoring to include such detailed requirements for construction was illustrated once in some litigation over a brick wall. From its external appearance the wall appeared to be a good piece of masonry. The bricks were laid to line, with carefully struck, broken joints, and it complied in other respects with the details specified for brick masonry in the code. The interior of the wall, on the other hand, as described by a trustworthy observer who saw the work being constructed, consisted of bats with unfilled joints of mortar laid bone dry on an excessively hot summer day; and none of these details were dealt with in the code. The outcome was that, inasmuch as the specific requirements of the code had been complied with, and as the defects reported were not provided for in the code, and as the completed work had a satisfactory appearance, the wall was a lawful structure and there was no cause for complaint. Had the code simply called for good and acceptable workmanship in accordance with well established practice, it is almost certain that the court would have based its judgment on the testimony of qualified witnesses as to what constitutes good practice and would have found the wall deficient; and the owner of the wall would have had the redress to which he was entitled.

There are, however, many matters in connection with building construction that affect the public safety with regard to which there is either no recognized, established practice or regarding which there are still honest differences of opinion as to the safe medium requirements, so that it is necessary to deal with these in more or less detail. Such, for instance, is the matter of interior stairways; how many must be provided?—where shall they be located?—what shall be their width?—how shall the treads and risers be proportioned?—when and how shall landings be introduced?—shall winders be permitted?—shall the stairways be enclosed, and with what construction?—how shall the enclosures be lighted?—to what points shall the stairs lead and exit?—what about handrails and other details, which are many?

Administration of the Code

One circumstance which will determine in a measure whether the code provisions may be general in their nature, indicating the purposes to be attained, or detailed and specific in character, is the means provided by the municipality for administering the statute. If, as may be the case in the smaller communities, limited financial resources preclude the employment of a properly qualified technical man, or one having a sufficiently long and varied experience in the building construction industry, there perhaps it is better to prescribe in detail all that is essential for safe building. But this sort of administration is suitable only where a few, old, well known materials are in use, where the buildings do not exceed two or three stories in height, and where there are not likely to be occupancies hazardous to life or property. It is rather difficult in these progressive days to conceive of any municipality that is content to restrict its development in this way.

For the proper governmental supervision of the building activities of any locality, the official charged with the administration should be informed on the nature and physical properties of building materials; he should be acquainted with current acceptable practice in the use of those materials; he must be capable of judging of the character of workmanship; he should be versed in the principles that underlie adequate lighting and ventilation of buildings; he must know the essentials of fire prevention; and he must understand the principles underlying planning adequate exit facilities. These things he must have mastered to the extent that he can speak with authority and will apply them with good judgment and reasonableness. In some municipalities the building official is also charged with the enforcement of statutes governing elevators, plumbing, electrical equipment, and smoke abatement. It is not expected that the official should be an expert in all these matters, but it does imply a knowledge of at least general principles of installation and operation. Such an official can be and should be clothed with the necessary authority to supply by regulations the detailed requirements which are not appropriately embodied in the code and which, if included, unnecessarily load up the statute with provisions that are likely soon to become obsolete, and which, depending on legislative action, are difficult to alter. If this appears to give considerable power to the official, let it be pointed out that authority goes with responsibility, and that there is no real responsibility where there is no authority. However small or insignificant the municipality in which he serves, the official should be clothed with a good measure of authority and responsibility anyhow, or else a low salaried clerk could fill the post quite as well. No matter how detailed the code may be, the official, unless he is a mere figure head, must to some extent exercise his own judgment in deciding whether a building operation conforms to the code, for it is practically impossible to meet every contingency in the code. If then the official has the qualifications, he may be trusted to pass on all the essentials for the accomplishment of the purposes to be attained.

The code itself should indicate the intent of the regulations that are authorized, should fix the manner of their promulgation, and should provide safeguards against arbitrariness in their adoption. To be legally valid, regulations must be limited to provisions for carrying out the intent of the statutory mandates; they cannot be in the nature of additional requirements. The intention might be appropriately expressed in the code so that, as far as practicable, the generally recognized standard specifications for

materials and rules of practice in construction as established by national technical organizations shall be accepted as, or at least used as the basis for, the authorized regulations. Such standards have already been referred to. It is not well to cite these by name in the code, as is sometimes done, as that may lead to confusion in the interpretation of the code. Formal public announcement that the promulgation of regulations respecting certain designated matters is contemplated should be required, and, if requested, an opportunity for a public discussion of the proposed regulations should be afforded before they become effective. Changes in the regulations should be made when necessary or desirable to keep them abreast of the times and to give to the public the benefits of improvements that may develop or of economies that may be effected in construction.

No Uniformity of Building Codes

At various times the question has been raised as to whether it is not possible to draft a building code that can be of uniform application. A satisfactory answer is difficult. It depends on many things. A reading of the various reports issued by the Building Code Committee of the U. S. Department of Commerce, a committee formed "in response to a generally expressed public demand for greater uniformity and economy in building code requirements," will show that complete uniformity is hardly attainable. Local conditions cannot be ignored in the preparation of a code, and these sometimes vary considerably with different localities. This same committee found, for example, that a standard of quality for brick that was reasonable in one section of the country would condemn as unfit a brick that has been in use for many years with a good service record in another section. Brick in various parts vary in strength. It would be manifestly unfair to fix the minimum wall thicknesses in accordance with the weakest product, thereby perhaps depriving those using a stronger grade of the economies to be had without sacrifice of safety in the use of thinner walls. Nor would it seem just to demand of the builders in regions where high winds have not been known that they build their structures, at increased costs, to meet the conditions of localities where violent storms are of frequent occurrence. Policy may dictate a different procedure or responsibility in the protection that should be given a neighbor's land or structure when excavation for a new building is undertaken in one or another territory. As already intimated, the facilities for enforcing the code would warrant varied requirements. J. E. Mackie, who as secretary of the Pacific Coast Building Officials' Conference was intimately in touch with the commendable effort to formulate the "Uniform Building Code of the Pacific Coast," in an address spoke of the difficulties encountered and referred to the opposition "in some quarters because of certain classification of occupancies, provisions of types of construction, and departure from present accepted practice." His further statement that "perhaps no common basis can be arrived at in the case of the two former" gives another ground for doubt of the possibility of uniformity, due to some local policy.

Uniformity in Arrangement Desirable

There is one respect in which uniformity in codes is desirable, in the interest of convenience to the users,—namely, in the arrangement. Architects and contractors, many of whom are engaged in building in various places, would save much time and annoyance if, in consulting the codes of those various places, they could find the several provisions arranged in somewhat the same order. Two methods suggest themselves. They are thus described in the report of the U. S. Building Code Committee on "Arrangement of Building Codes." "The first takes up each major class of occupancy, as for example, office buildings, tenements, small dwellings, factories, etc., and gives in separate chapters a full statement of code provisions applying to each, even though this involves considerable repetition. Certain general matters, such as allowable working stresses, the quality and testing of materials, administration, etc., are treated in separate chapters without reference to occupancy. The second method classifies buildings by type of construction and gives the fundamental structural features of each type. Occupancies also are classified, and the general construction type necessary for each occupancy class is specified. This is followed by chapters giving the detailed requirements for each construction type and for other essential features, such as quality of materials, means of egress, etc., from which the requirements for each building may be selected."

It is by no means easy to decide which of these methods is the more meritorious. Each has marked advantages. As an example of use of the first method, the building code of Flint, Mich., may be cited. The second method has been followed in the building code of Cumberland, Md. After due consideration of suggestions and criticisms from scores of architects, engineers, buildings officials and others, the committee has recommended an arrangement based on the second method. For the details, the report itself, published by the Government Printing Office, at Washington, should be consulted.

Physical Make-up for Convenient Use

A few words on the structure or make-up of a building code would perhaps not be amiss. Such an ordinance is necessarily a voluminous instrument, especially when it embraces, as it should, all matters relating to the construction, alterations, repairing, removal, location, equipment, occupancy and use of buildings, including most of the provisions that are embodied in housing and zoning laws. With so many matters to cover, in an effort to make its pro-

visions readily available, an extensive subdivision of the text is desirable. Long paragraphs and involved sentences should as far as possible, be avoided. Ease of consultation should be kept constantly in mind. In this connection a comprehensive index, though not a part of the legislative statute, is highly desirable when the code is printed for distribution. Similarly, annotations and cross references at appropriate points in the printed copy add much to its usefulness. The building law frequently constitutes a part of a code of ordinances. As such it is properly designated a "chapter" of such a code. This chapter should be divided into major parts called "articles," numbered serially, each dealing with a general, broad subject, such as "1. Administration"; "7, Means of Egress"; "9, Construction"; "14, Elevators"; taken from the recommended arrangement of the U. S. Building Code Committee. In "sections," into which articles are divided, the leading items of the code are treated, as "Reinforced Concrete" under "Construction"; "Allowable Working Stresses" under "Materials, Loads and Stresses"; "Courts," under "Light and Ventilation"; "Permits," under "Administration." Each section should have a title as indicated, and the sections should be numbered serially from the beginning throughout the code, though not continuously; that is in the first article the section numbers will perhaps run to 7, then in the next article the section numbers should begin with 10, leaving the intermediate numbers for possible future additions, and so with other articles, in this way avoiding a general renumbering or the awkward expedient of a number and a letter (16A for instance) for the section. In some codes the section numbers start anew in each article. This makes it necessary in citing a section to mention the article number as well; it also makes it more difficult to locate the section when consulting the code. As far as may be desirable, for greater ease in finding particular provisions, the sections may be further divided into numbered sub-sections, and these again into lettered paragraphs, this making for convenience.

Conflicting Local Codes and Laws

A historical inquiry would show that the present more or less elaborate building laws have developed from the so-called "fire limits ordinances" that it was found necessary to enact many years ago, as the fire hazard increased with the more intensive development of land in the heart of a municipality. These fire limits ordinances were, in fact, our first zoning ordinances. They fixed districts within which, in the interest of public safety, no further building of frame structures would be permitted, in this way controlling to some extent the construction of buildings. In some cases these restrictions are embodied in separate ordinances, but as they deal with building construction, they logically are part of the building code. It has been the custom in the past to incorporate in the ordinances long, detailed descriptions of the boundaries of the fire limits. This necessitates lengthy amendments when changes are made. The practice in zoning ordinances of referring to maps has never been questioned. The same medium could be employed to advantage in fixing fire limits. At the same time, provision might well be made for the extension according to certain definite principles, perhaps at stated periods, of such limits with the expansion of the congested areas, through public announcement by the administrative official. In many cities zoning ordinances have been adopted since the enactment or latest revision of the building code. The draftsmen of zoning ordinances have generally paid no attention to the existing ordinances affecting buildings and have fixed restrictions of height and limitations of area that are in conflict with provisions of the older statutes. To dispel confusion, revision is needed. This more likely would be avoided if the zoning ordinance were made part of the building code; it certainly would be a convenience to those designing buildings. What has been said as to the desirability of making the requirements of zoning ordinances part of the building code applies to housing laws with greater force. Their provisions for open spaces do not generally accord with provisions of either the building code or the zoning ordinance. What the proper minimum requirements for open spaces in the interest of public health and safety should be, is no doubt subject to debate, but it does not tend to hold the respect of the layman for the law when there are conflicting requirements of which he is uncertain as to the law he must observe. Nor does it increase his regard to find that there is somewhere a provision that, in the case of conflict, the severest requirement must apply, yet this is sometimes the case.

One of the most important features of a building code, one that, until the recent past, has been generally neglected, has to do with means of egress. Thousands of lives have been sacrificed because adequate exit facilities were wanting. Although much thoughtful study has been given the subject, especially by the Committee on Building Exits Code under the sponsorship of the National Fire Protection Association, a generally accepted practice has not been established, and for this reason rather detailed specifications are necessary in the building code.

The Need for Building Codes

To many persons, to engineers more particularly, a building code suggests only a set of rules governing the strength, stability and construction of buildings. But in respect to these matters rules of good practice are probably better established and more faithfully followed than rules regarding other matters dealt with in a building code. If it were not for the existence of irresponsible architects, incompetent engineers and unscrupulous builders, who unfortunately are permitted to ply their trade, very little provision in this connection would be needed.

THE ARCHITECTS' FORUM

A BUSINESS COURSE IN AN ARCHITECTURAL SCHOOL?

BY
WILLIAM A. BORING
PROFESSOR OF ARCHITECTURE, COLUMBIA UNIVERSITY

I AM asked if a business course is essential to the curriculum of a model school of architecture. A business training is useful and necessary for every man who has to make a living, who has to attend to his banking, to his investments, and to whatever he undertakes; it is not confined to practicing architects nor, on the other hand, should it be conspicuously left out of an architect's education. An engineer, a lawyer, a doctor, should know how to attend to business, but they are not supposed to learn this in college during the four or six short years they have to study their chosen professions. It is well known that no man is permitted to practice architecture under the registration laws until he has had two years' experience under a preceptor after graduation, and during that time he is supposed to learn those things which relate to the conduct of business and to avoid the errors revealed by the questionnaire on page 152.

Now every architect must keep some kind of accounts, but a young architect who starts in with the idea that he should use double-entry bookkeeping and put down all of his own time and the salaries of his men and overhead, and figure that out according to each commission, will never get far in good designing. Such work is done in most good offices by bookkeepers, as there are more important things for the architect to do in the practice of his profession. There are larger questions than those mentioned that really are much more important, such as giving the client the required data as to size and scope of a building operation measured by the cost; telling him the truth about his estimates, including an allowance for extras; representing in drawings the amount of good and complete buildings which the money will buy; shielding him from irresponsible contractors who will get him into trouble; avoiding sub-contractors of poor credit, who have liens filed against them. He must learn to make for the contractor honest working drawings which will carry the facts so that he will not make mistakes in estimates or construction. These things should be taught in the schools.

Specifications are taught to explain clearly in plain language what is intended to be in the building without copying the phraseology of someone else. General unnecessary inclusive clauses are not a part of the specifications, as he is taught. It is customary if a man is absorbed in design and cannot give the proper attention to the business side of his practice for him to secure a partner or an assistant who can very well attend to all the routine work, which is not difficult to accomplish with good, honest work and application. This leaves to the man who is especially fitted by endowment and education, as every good architect should be, entire charge of the creative side of the practice of architecture. In a man's early practice he can find time for ample study of works on legal questions which will guide him safely with regard to his responsibility and the nature of contracts. He can also study all kinds of technical advice on banking and bookkeeping and the laws of the land with regard to building and liens. It is not difficult for him to get any of the information which is suggested in Mr. Embury's questionnaire, by simply applying his mind to it in his off hours.

In schools of architecture the main thing is to give a man a thorough knowledge of architecture itself. Then after he knows how to design, to construct, and to draw out a building, he is given a high ideal of his duty to the profession, to his client, and to the contractor. He is taught that he must be first of all a man of honor, and must take no chances whatever in handling his client's affairs, which must always be done with diligence and accuracy. Of course an architect who cannot control others, who has no power to delegate work, who tries to do everything himself and is his own bookkeeper to boot, is going to run upon the rocks. An architect does not have to take a business course in order to handle his practice successfully. Schools of architecture must teach design, first and foremost. In order to teach design they must give sound training in drawing, practical construction, and the theory of writing specifications and making working drawings. A certain amount of time should be spent in the study of buildings under construction, the general theory of contracts, and the best methods of carrying on a building operation.

The schools of architecture exist to teach men things that they cannot learn so well or so quickly in any other way. They teach them, above all things, how to design good architecture; that the foundation must hold, and the roof keep out water; the chimney must draw, and honest supervision must be exercised. They advise him that he should work under a preceptor at least two and a half years to acquire practice, just as a young doctor does his hospital work before he goes into practice for himself. It is during these years of apprenticeship in a good office that he should learn the practical and business side of the profession. It has never seemed to me either advisable or necessary to put into the already crowded curriculum of his course the subjects of business and practice. Architecture is essentially a fine art, and the schools are right in treating the subject as such and in training their students to design.

ASK ME ANOTHER

BY
AYMAR EMBURY II

EDITOR'S NOTE:—As the business side of an architect's practice has become more and more important and voluminous during the past 15 years, the question is often raised as to the propriety of including in the curriculum of the modern architectural school a course on business practice as pertaining to the architectural profession. The deans of our numerous schools of architecture seem to take the stand that there is no time or opportunity for the inclusion of such a course in the curriculum of their schools. Many maintain that such a course has no place in an architectural school.

There is no doubt about the value in obtaining the varying points of view of leading architects and educators on any mooted subject pertaining to the profession. It is interesting, therefore, to obtain opinions on a subject such as this, however diverse and opposed they may be. It was for the purpose of obtaining such differing opinions that THE ARCHITECTURAL FORUM requested both Mr. Boring and Mr. Embury to give an expression of their opinion as to whether a business course should be included in architectural schools. The brief article by Mr. Boring, who takes the negative point of view, precedes this amusing questionnaire by Aymar Embury II. Mr. Embury believes that the questions, answered correctly, prove his contention that architectural schools should include a business course. Put down your answers to Mr. Embury's "Ask Me Another" and determine for yourself whether he is justified in taking the affirmative side in this debate.

1. Should an architect keep books?
2. Do you know how to keep books?
3. Where did you learn?
4. Is yours a good method?
5. How do you know?
6. If an architect is paid by a note, can be discount it?
7. Can a contractor discount a note?
8. If a contractor is paid by note and the note is not met, should your certificate show the amount as unpaid?
9. If an owner gives an order for additional work direct to the contractor, should its cost be included in your certificate as extra work?
10. Are you responsible for its proper execution?
11. Can you charge a commission on it?
12. Do your draftsmen keep time cards?
13. What do you do with the time cards?
14. Are your traveling expenses charged to the commissions?
15. Are your telephone calls charged to the commissions?
16. Do you charge overhead?
17. Do you know what your overhead is?
18. How do you know?
19. What is overhead?
20. How do you proportion it to your commissions?
21. If a draftsman does jury duty, is his salary paid?
22. To what account is this charged?
23. Do you know how to write a contract?
24. Is a verbal contract binding?
25. Can you alter a contract once made?
26. Can a written contract be altered verbally?
27. When is an extra binding on the client?
28. Can you order an extra verbally?
29. Can the cost of an extra be collected from you?
30. Why?
31. Have you a contract with your client?
32. If a client comes into your office and orders sketches, does he have to pay for them?
33. What is a mechanic's lien?
34. Who can file one?
35. Can a lien be filed by a contractor?
36. By a mechanic working for a sub-contractor?
37. What is a sub-contractor?
38. Can the architect order changes in the work of a sub-contractor?
39. How?
40. Can an architect file a mechanic's lien in New York? In New Jersey? In Texas?
41. If he can, when can it be filed?
42. Should a general contract be filed with the county clerk?
43. Why?
44. Must you have a license to practice architecture?
45. Can you make drawings without a license?
46. Can you superintend without a license?
47. How do you know?
48. Suppose that you are building a house with three sub-contractors and the work of one of them is damaged by some undetermined party,—who pays for the damage?
49. Should you be paid for changes in sketches?
50. Should you be paid for changes in drawings?
51. When does a sketch become a working drawing?
52. What is "substantial completion"?
53. If a front door lock is unsatisfactory to the client, can he hold up the last payment to the contractor and yourself?
54. Where can you learn about these things?
55. How did you find out where you could learn about these things?
56. Would you have saved money if you had known about these things before you began practice?
57. Could your instructors in college have told you where to find out?
58. Could they have told you what was important?
59. Would it have taken them long to do it?
60. Should they have done it?
61. Could they have done it in one hour a week for one term?
62. Is such a business course desirable?